THOMSON

RD5000 / RD5002

Multiformat MPEG-4 Receiver Decoder

User Manual

(Release 7.7.1)

Edition A

CE

www.thomson-networks.com

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VIDEO NETWORKS

Ref. :

DECLARATION DE CONFORMITE CE
EU DECLARATION OF CONFORMITY

Thomson Grass Valley France SA — 1, rue de l'Hautil, Zone des Boutries, 78700 Conflans-Sainte-Honorine

Matériels
Equipments :

Code Article *Part number :*	**Produit** *Products :*
NRD50000AA	RD5000 MPEG-2/4 SD&HD 420 Decoder. 2 stereo audio channels, Common interface support, 1RU
NRD50020AA	RD5000 MPEG-2/4 SD&HD 420 dual Decoder. 2 stereo audio channels, 1xCommon interface per decoder, 1RU
NRD10000AA	RD1000 Single Multiservices descrambler, 2xCommon interface (up to 48Pids CAS dependent), 1RU
NRD10020AA	RD1000 Dual Multiservices descrambler, 1xCommon interface (up to 24Pids CAS dependent) per input, 1RU

Je soussigné,
I the undersigned,

Déclare avoir acquis la présomption de conformité du matériel ci-dessus référencé, utilisé et
Declare that the herebove references' product, used and installed according to its user notice,
installé conformément à la notice, aux exigences essentielles des directives suivantes :
acquired the presumption of conformity to the essential requirement of the following directives:

- **Sécurité: Directive Basse Tension 2006/95/EC, par l'application de la norme EN 60950-1 :2006**
- *Safety: Low Voltage Directive, 2006/95/EC, by application of the standard EN 60950-1:2006.*

- **Compatibilité électromagnétique: Directive 2004/108/EC, par l'application des normes EN 55022 :2006, EN 61000-3-2 :2006, EN61000-3-3 :1995 +A1 +A2 et EN 55024 :1998 +A1 +A2.**
- *Electromagnetic compatibility: Directive 2004/108/EC, by application of the standards EN 55022 :2006, EN 61000-3-2:2006, EN61000-3-3:1995 +A1 +A2 and EN 55024:1998 +A1 +A2.*

Date,	**Nom,**	**Fonction,**	**Visa ,**
05/10/2010	V. CARATTO	PRODUCT MANAGER	

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FCC Class A Information

The RD5000 and RD5002 have been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his or her own expense.

Shielded cables must be used with this unit to ensure compliance with the Class A FCC limits.

⚠***Warning: Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.***

Registered Trademarks

Dolby and the double-D symbol are registered trademarks of Dolby laboratories.

As regards the broadcasting of televised programmes, MPEG-4 licences are unlike MPEG-2 ones in that they are linked to services and not devices (Encoders and Decoders). Content providers or operators are therefore requested to familiarise themselves with the licensing conditions for MPEG4-AVC technology and to obtain the rights from the relevant bodies before broadcasting programmes in MPEG-4.

WARNING

PLEASE OBSERVE THESE SAFETY PRECAUTIONS

There is always a danger present when using electronic equipment.

Unexpected high voltages can be present at unusual locations in defective equipment and signal distribution systems. Become familiar with the equipment that you are working with and observe the following safety precautions.

- Every precaution has been taken in the design of your unit to ensure that it is as safe as possible. However, safe operation depends on you the operator.

- Always be sure your equipment is in good working order. Ensure that all points of connection are secure to the chassis and that protective covers are in place and secured with fasteners.

- Never work alone when working in hazardous conditions. Always have another person close by in case of an accident.

- Always refer to the manual for safe operation. If you have a question about the application or operation call THOMSON for assistance.

- Never allow your equipment to be exposed to water or high moisture environments. If exposed to a liquid, remove power safely (at the breaker) and send your equipment to be serviced by a qualified technician.

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Overview

The RD5000 or RD5002 is extremely versatile piece of equipment and in order to further expand its capabilities its internal setup can be factory configured in a number of different ways.

The RD5000 is a mono channel receiver decoder

RD5000 Standard configuration

This configuration provides one video output. The placement of input/output cards can be in slots 1-2, 1-3, 1-4, 2-2, 2-3, 2-4). Video output card may only be placed in slot 1-1. This configuration allows for the tuning of two independent audio services. Only one input may be active and only one program decoded at any time.

RD5000 with 4 audio option (NRD00H07AA)

The placement of input/output cards can be in slots 1-2, 1-3, 1-4, 2-2, 2-3, 2-4). This configuration allows for the tuning of four independent audio services. This configuration allows for up to two video output cards. Video outputs cards may be placed in slots 1-1 and 2-1. This configuration is commonly used to provide an HD and SD video output from the same input signal. Only one input may be active and only one program decoded at any time.

The RD5002 is a dual channels receiver decoder

This configuration offers 2 independent receivers decoders, each having its own inputs and outputs. The placement of input/output cards can be in slots 1-2, 1-3, 1-4 for receiver #1 (RDS1) and 2-2, 2-3, 2-4 for receiver #2 (RDS2). One input per RDS can be active at a time. Each RDS can decode its own program.

Ordering references

- **Base Unit**

References	Name	Description
NRD50000AA	**RD5000**	Base unit : 1RU chassis MPEG2/MPEG4 SD&HD 4:2:0 Single decoder, AC Power Supply 2 stereo audio channel Common interface support
NRD50020AA	**RD5002**	Base unit : 1RU chassis MPEG2/MPEG4 SD&HD 4:2:0 Dual decoder, AC Power Supply 2 stereo audio channel 1 Common interface per decoder

- **Options**

References	Name	Description
NRD00H06AA	**SD/HD SDI**	Hardware Option. SD/HD SDI output and analogue output
NRD00H09AA	**Analogue video**	Hardware Option. 1xRGB/YPrPb, 1xComposite video output
NRD00H02AA	**ASI in/out**	Hardware Option. ASI input/output (DVB-ASI or SMPTE310M selectable)
NRD00H12AB	**DVB-S2 in**	Hardware Option. DVB-S/DVB-S2 quad port interface
NRD00H04AA	**COFDM**	Hardware Option. COFDM input interface
NRD00HA0AA	**audio outputs**	Hardware Option. Audio outputs (AES digital, analog) & Dolby E pass-through
NRD00HCSAA	**8VSB**	Hardware Option. 8 VSB input interface
NRD00H05AA	**MPEGoIP**	Hardware Option. MPEG over IP input with FEC, and output over 2xGiga interfaces
NRD00H13AA	**PID Filter MPEGoIP**	Hardware Option. Dual MPEG over IP output with PID filtering
NRD00H10AA	**GPIO**	Hardware Option. General Purpose In and Out
NRD00H07AA	**4 audios**	Harware Option. Up to 4 audios channels on RD5000
NRD00HC2AA	**Audio break out cable**	Hardware Option. Audio break out cable subD15 to 4 XLR (for audio analog, channel 1 - L, R, channel 2 - L, R) and BNC (for Dolby E) To be used with NRD00HA0AA
NRD00HC3AA	**Analog video break out cable**	Hardware Option. Analog video break output cable subD 15 to 6 BNC (for Red/Pr, Green/Y, Blue/Pb, Composite, Horizontal Sync and Vertical Sync) To be used with NRD00H06AA or NRD00H09AA
NRD00S01AA	**SCTE35 =>104**	Software Option. Conversion from SCTE35 to SCTE104
NRD00S02AA	**DVB-S2 adv modes**	Software Option. DVB-S2 Advanced modes (16APSK, 32APSK, ISI filtering, VCM)

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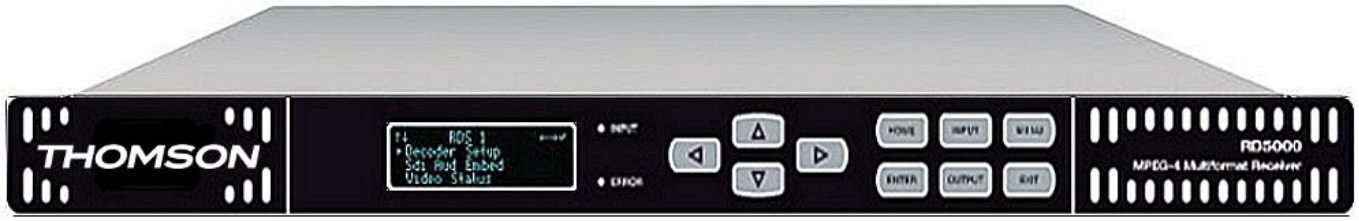
Section 1 – Getting Started



Introduction

This section includes the following topics:

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1.1 Installation

Cooling

The unit is cooled via forced induction through the front of the unit and exhausted through the vents on either side. The unit is equipped with a temperature controlled status indicator. If the temperature in the inside of the unit exceeds 70° C the red “Error” LED will illuminate and a description of the error will appear in the “Error List.”

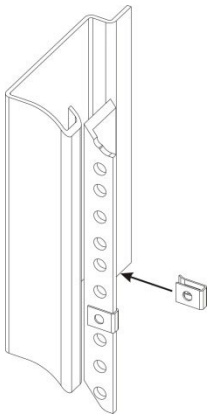
Rack Information

The unit is intended to be mounted in a standard 19” rack. It occupies 1RU of rack space and the connections are all on the rear of the unit.

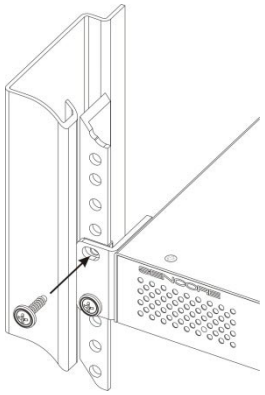
Rack Installation

To install the unit into a rack use the following steps:

1. Determine the desired position in the rack for the unit making sure that the air intake on the front of the unit and the exhausts on the sides of the unit will not be obstructed.
2. Insert the rack mount clips into place over the mounting holes in the rack.
3. Slide the unit into position in the rack.



4. Secure the unit to the rack by installing the four supplied screws through the front mounting holes and tightening.



Power Connection

Using the proper power connections is vital to the safe operation of the unit. Only use the supplied 3-prong power connector or one with equal specifications. NEVER tamper with or remove the 3rd – prong grounding pin. This could cause damage to the unit, personnel, or property.

AC Power Connection

The unit is intended for use on either 120V or 240V systems. The power supply will automatically detect the system it is connected to. To hook up the power use the following steps:

1. Locate the AC power cord that was included with the unit.
2. Plug the female end of the power cord (end with no prongs) into the back of the unit.
3. Locate a protected outlet (usually inside of the rack) to plug the male end of the power cable into.

1.2 Quick Start Guide

Quick Start

To get the unit up and running there is a few things that need to be done.

1. Select the desired input as active.
2. Setup the decoder with the proper PIDs.
3. Setup the desired output(s).

The easiest way to set these options up is to refer to *Section 4*. At the beginning of *Section 4* is a table that shows the specific cards included in that section. Find the desired card in the table, then navigate to the corresponding page number and follow the step-by-step instructions.

1.3 Maintenance

The unit is virtually a maintenance-free piece of equipment. There are no user serviceable parts on the inside of the unit however it is recommended that the user cleans the intake filter on the front right side of the unit on a regular basis to ensure the unit has an unobstructed cool air intake. This filter is removed easily, for cleaning, by opening the door on the front right side of the unit and removing the filter.

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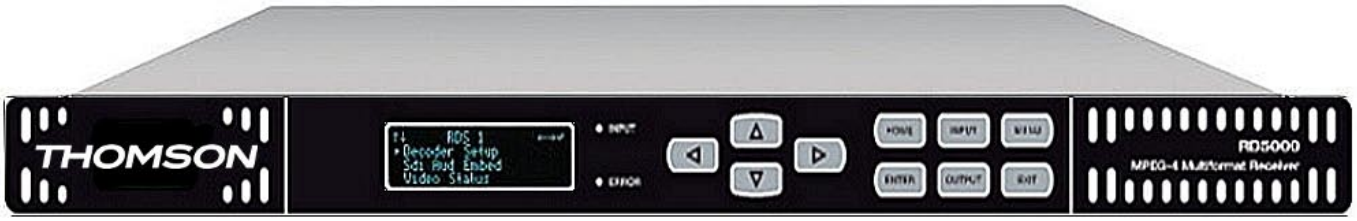
Section 2 – Controls and Configuration



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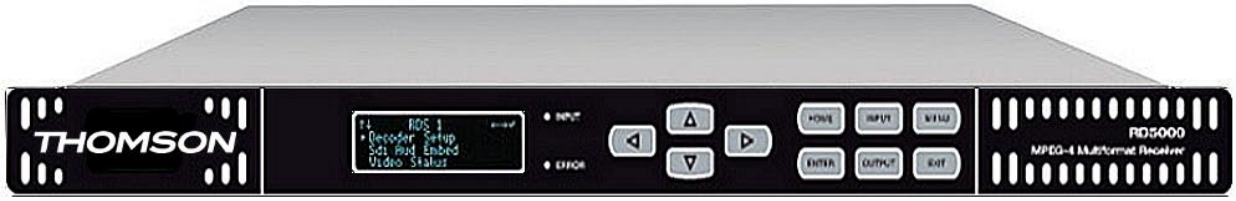
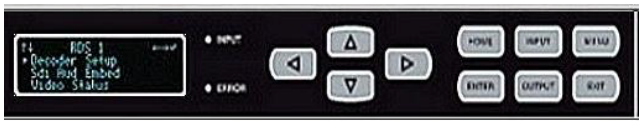
2.1 Front of Unit

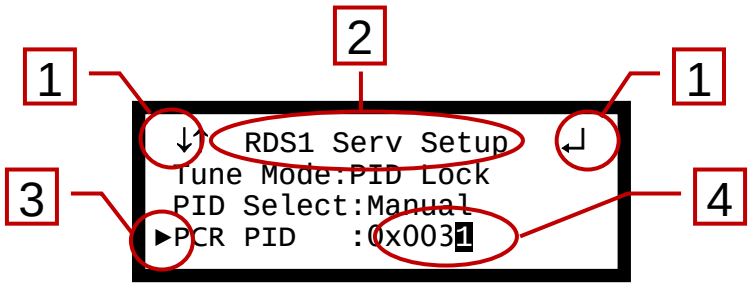


2.2 Rear of Unit

2.3 Front Panel Display Layout



The following figure shows a typical screen on the front panel. Several important features have been circled and noted below. These features are common to all screens and assist when navigating, viewing and editing unit information. The HOME button will return the user to the home level while in any screen. In order to edit a selected parameter, the ENTER button must be pressed. Once a parameter has been changed, the ENTER button must be pressed again before the change takes effect on the unit. Pressing the EXIT button will leave an edit mode without changes taking effect.



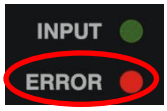
1. Icons indicate which control buttons are currently valid for entry.
2. Screen title.
3. Cursor shows which line is active.
4. When editing, active character or item is highlighted.

2.4 Front Panel Indicators

The unit has four internal error parameters: INPUT, DECODER, FAN and TEMPERATURE. These parameters can be monitored locally or remotely. Locally the unit's status can be checked by visually looking at the INPUT LED and the ERROR LED on the front panel, then use the "Error List" under the MENU button to pinpoint the error. Remotely, the unit's status can be checked by using the web client and looking at the status icons on the top of the main window. To see a detailed list of errors, click on the Unit tab from the web client.

The INPUT LED indicates the presence of a stream at the user-selected input. "Stream present" is represented by a green INPUT LED while "stream NOT present" is represented by a dark INPUT LED.

The ERROR LED represents the combined status of the unit's error indicators. If INPUT, DECODER, TEMP, or FAN status is in the error state, the LED will be red. If all error indicators are good, the LED will be dark.



2.5 Input Error Logic

The input status is based on the selected input card's status and the transport error indicator bit in the transport stream being decoded. For example if the current input is VSB, the input status is based on: VSB receiver lock, RF channel level, and the MER level. The RF channel and MER thresholds can be set by the user. If the unit detects the presence of the transport error bit in a transport packet header, the input status will be an error for 0.5 seconds each time the TS error bit is set. The system must detect a constant cadence of sync bytes (0x47h) every 188 bytes and detect a valid PAT at least every 500 ms in order for the INPUT LED to illuminate.

2.6 Decoder Error Logic

The decoder error indicator is based on the decoder's ability to decode what the user has requested. The input status will be alarmed differently depending on the current decoding mode:

In “**Auto Mode**”, the decoder status will be good unless the Video or Audio decoders cannot decode a stream. For example: a stream defines program 4 to have video on PID 52. If PID 52 is not actually present in the stream, or is un-decodable, the decoder status will be in the error state. This is true for all modes.

In “**PID Lock Mode**”, the decoder status will be good if all of the PIDs entered by the user, for video and audio, are being decoded by the unit. If the user wants nothing to be decoded, they can set a PID to 0. If the user enters a PID which is not present or cannot be decoded the decoder status will be in the error state.

In “**Program Priority Mode**”, the decoder status will be good if any priority is currently active and the Audio and Video represented by that priority are being decoded. If the PMT for a selected program lists a video or audio PID, but the decoder cannot decode that PID, the indicator will be in the error state. If the user enters an index for a priority that does not exist in the PMT, the indicator will still be good because the decoder will be set to decode nothing on that audio output.

2.7 Temperature Error Logic

The temperature error indicator is based on the correct operation of the unit. If the unit’s internal temperature exceeds 70 degrees C, the temperature status will be in the error state.

2.8 Fan Error Logic

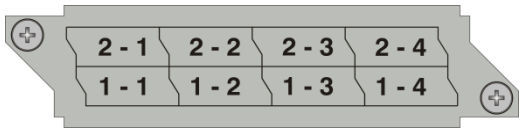
If the fan in the unit fails, the fan status will be in the error state. The fan status will be good as long as the fan is spinning at the proper RPM.

2.9 SNMP Traps

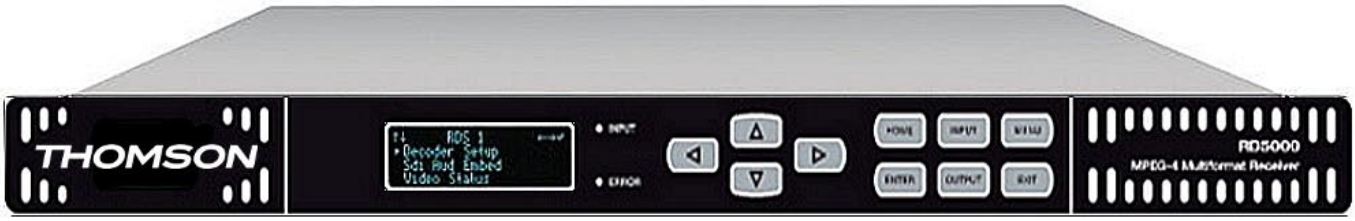
The unit contains separate SNMP Traps for Fan Status, Temperature Status, Decoder Status, Input Status, and IP Receive Group. Whenever any item changes state, a trap is sent to the configured host.

2.10 Input/Output Slot Organization

The unit’s modular design allows many different input/output configurations. An indexing system is used to identify module slots for configuration and monitoring reference. The bottom row of slots is numbered 1-1 through 1-4 (left to right). The top row is numbered 2-1 through 2-4 as shown.



Section 3 – Option Cards Overview



Introduction

This section includes a brief overview of the different option cards that are available for the unit. There are descriptions of each card as well as pictures of the various inputs and outputs for each card.

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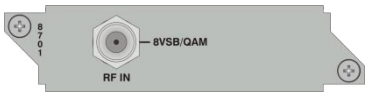
3.14 Advanced Satellite Features – Option NRD00S02AA 27

	3.1 8VSB/QAM Receiver – Option NRD00HCSAA
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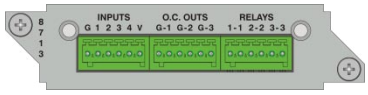
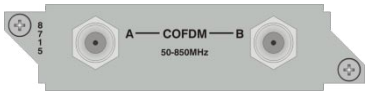
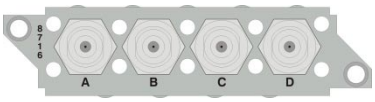
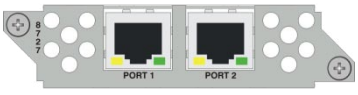
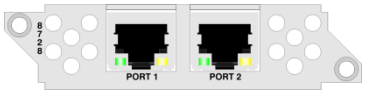
	3.5 Up to 4 audio channels – Option NRD00H07AA
	3.6 Video Output (2 SD/HD-SDI, 1 RGBHV/YPbPr/Composite) – Option NRD00H06AA
	3.7 GPIO Module – Option NRD00H10AA
	3.8 Dual Input COFDM Receiver – Option NRD00H04AA
	3.9 Quad Input DVB-S/DVB-S2 with LNB – Option NRD00H12AB
	3.10 CAM Decryption – Basic feature
	3.11 Dual MPEG over IP Input/ UDP Output – Option NRD00H05AA
	3.12 Dual MPEG over IP output with PID filtering – Option NRD00H13AA
	3.13 SCTE35 to SCTE104 – Option NRD00S01AA

	3.14 Advanced Satellite Features – Option NRD00S02AA

3.1 8VSB/QAM Receiver – Option NRD00HCSAA

This card will receive a TS that is demodulated from an 8VSB signal or it will demodulate a QAM64B or QAM256B RF input. With an 8VSB input, the card will tune to channels 2 – 69. With a QAM input, the card will tune to channels 2 – 134 in three cable frequency bands (FCC, IRC, and HRC). The unit will show a valid input if the following conditions are met: the receiver equalizer and the FEC are locked. If the RF level is lower than the “Low Warning Setting” or the MER is lower than the “Low MER Warning Setting”, the red “Error” LED will illuminate on the front panel and there will be an error recorded in the Error List.

3.2 Serial Transport Stream I/O (DVB-ASI/SMPTE 310M) – Option NRD00H02AA

This card will receive a TS from either a DVB-ASI input or a SMPTE 310M input. Only one format may be selected at a time. For an ASI input, the bitrate of the TS must be between 1.5 Mb/s and 160 Mb/s. For a SMPTE 310M input, the bitrate of the TS must be 19.392658 Mb/s. The selected input format will also be the output format.

In ASI mode the ASI OUT will output the TS signal after de-scrambling coming from the active input, whatever the input (ASI, DVB S/S2, IP...)

3.3 Video Output (1 RGBHV/YPbPr, 1 Composite) – Option NRD00H09AA

An analog only video output card that can output either high definition or standard definition formats. Two outputs are on the card: one BNC for composite (NTSC & PAL) and one 15-pin D-sub for component (RGBHV or YPbPr). The card outputs an SD or HD signal, one at a time. Closed caption (NTSC), detected in the transport stream, can be inserted on line 21 of the composite (NTSC video) output.

3.4 Audio Output (Dolby E, AES Digital, Analog) – Option NRD00HA0AA

This card allows the output of both Digital-AES and analog audio. Each digital audio output can be set to either Raw or PCM. In Raw, the compressed audio for the selected PID is passed through to the digital output. Typically this setting is used to pass-through the Dolby AC-3 compressed digital signal. When the digital audio output is set to PCM, two-channel linear coded PCM AES/EBU audio is output to the digital output. The analog output provides two-channel (L, R) decoded analog audio from the selected audio processor. The two audio processors on the decoder board, feeding the two digital outputs, can process or decode Dolby AC-3, MPEG Layer 1, AAC or MPEG Layer 2 formats. The audio processor will self-sense which type of audio is in the TS. The NRD00HA0AA also has a Dolby E parsing feature.

3.5 Up to 4 audio channels – Option NRD00H07AA

This option allows to decode 2 additional audio PID with the RD5000 decoder. The maximum number of decoded audio PID is then of 4 (without option the RD5000 can decode 2 audio PID). The decoded audios can be embedded in SDI signal or can be processed via 2 optional audio cards (NRD00HA0AA), each optional audio card being able to process 2 audio channels.

3.6 Video Output (2 SD/HD-SDI, 1 RGBHV/YPbPr/Composite) – Option NRD00H06AA

A versatile video output card. It provides two user selectable serial digital (SMPTE 259M, or SMPTE 292M) outputs and one component RGBHV or YPbPr/Composite NTSC & PAL output. Four pairs of audio can be embedded into the serial output on group 1, and 2. Closed captioning found within the transport (608/708B) can be embedded into the serial video output. NTSC closed caption, detected in the transport stream, can be inserted on line 21.

3.7 GPIO Module – Option NRD00H10AA

This module is considered a global unit option. In other words, the inputs and outputs of a single installed module can be accessed by functions associated with general system features, or RDS specific features in any unit configuration. Only one GPIO module can be installed in a unit.

3.8 Dual Input COFDM Receiver – Option NRD00H04AA

This card will input a (49 – 861 MHz) COFDM signal for use in electronic news gathering (U.S.) or any COFDM Terrestrial Broadcast (DVB-T, European) applications. The card provides A and B inputs, which may be independently configured, but only one may be active at a time.

3.9 Quad Input DVB-S/DVB-S2 with LNB – Option NRD00H12AB

This card will input a satellite L-band (950 MHz – 2150 MHz) signal for demodulation of KU-band or C-band DVB-S QPSK signals or DVB-S2 QPSK/8PSK signals. The symbol rate ranges from 1 MSym/s to 45 MSym/s for both DVB-S and DVB-S2. This card provides LNB power and 22 kHz control tone to the active input. This card has advanced feature options of multistream input, support for VCM, and support for 16APSK and 32APSK modulation. The “Input” LED will only illuminate if the card detects frequency, symbol rate, FEC lock (Carrier Lock), and TS sync (Sync Lock). The card provides A, B, C and D inputs, which may be independently configured, but only one may be active at a time.

3.10 CAM Decryption – Basic feature

This is a factory installed slot that will allow for up to two CAM cards to be installed at a time, giving the unit the ability to decrypt Conditional Access transport streams.

In a single channel configuration, the two CAM slot are automatically daisy chained. It allows supporting up to two CAS systems per incoming Transport Stream.

In dual channels configuration, a CAM slot is allocated to each channel.

The CAM interface bitrate is limited to 72Mbps. It receives the total incoming TS, not only the scrambled services.

Caution: Some input interfaces could provide more than 72Mbps, thus preventing correct decryption.

This option also enables BISS mode 1 & E descryption. It manages one key per channel, means one key for a single configuration and two keys for a dual configuration.

3.11 Dual MPEG over IP Input/ UDP Output – Option NRD00H05AA

This card is a dual purpose card in that it can receive and/or transmit from the internal TS bus, MPEG over IP. It has two physical connectors that can be configured independently. Up to two multicasts can be subscribed to, allowing for a backup multicast to be chosen and two UDP mirrored unicasts can be transmitted to allow for redundancy

Example Configurations:

"Leave" IGMP V2 & V3 Multicast/Unicast
Filter Mode: Include
IP list: *empty*

"Join" IGMP V2 & V3 Multicast/Unicast
Filter Mode: Exclude
IP list: *empty*

"Join Filtered" IGMP V3 Multicast/Unicast
Filter Mode: Include
IP: X.X.X.X
Or
Filter Mode: Exclude
IP: X.X.X.X

IP Address Selection

Unicast: X.X.X.X – 223.255.255.255
Multicast: 224.X.X.X – 239.255.255.255
Suggested Multicast Range: 239.192.X.X

Suggested Port Selection

- Choose a port number of 5000 or more
- Choose even numbered ports
- If using FEC the following example applies
    - Destination port = 5000
    - Column FEC = 5002
    - Row REC = 5004
    - Next available multicast port = 5006

3.12 Dual MPEG over IP output with PID filtering – Option NRD00H13AA

This card has the ablility to "remultiplex" the active input TS into a transport stream with reduced services and/or a lower bitrate before transmission onto the network.

The NRD00H13AA option is a single slot output only card that supports PID filtering and automatic table modification. The NRD00H13AA output cardwill use two Ethernet connections independently to transmit MPEG2 transport streams over IP networks from a valid input source (ASI, DVB-S2, IP input, etc.) A multi program transport stream (MPTS) input can be reduced into as many as 5 output transport streams. Any combination of services present in the source stream may be selected for the output transport stream. Each output IP stream can then be routed to one of two Ethernet ports as desired. The NRD00H13AA can also adapt the transport stream bitrate and recalculate the PCR values in the output transport streams to be correct for the new multiplex.

IP Address Selection

Unicast: X.X.X.X – 223.255.255.255
Multicast: 224.X.X.X – 239.255.255.255
Suggested Multicast Range: 239.192.X.X

3.13 SCTE35 to SCTE104 – Option NRD00S01AA

This software option allows the conversion from SCTE35 to SCTE104.

3.14 Advanced Satellite Features – Option NRD00S02AA

This software option enable the Advanced Satellite Features of the NRD00H12AB (DVB-S/DVB-S2 Quad port receiver optional card).

If the NRD00S02AA option is installed, the"Multistream" settings will be available and the NRD00H12AB card will be able to receive multistream transport streams, VCM, 16APSK modulation and 32APSK modulation.

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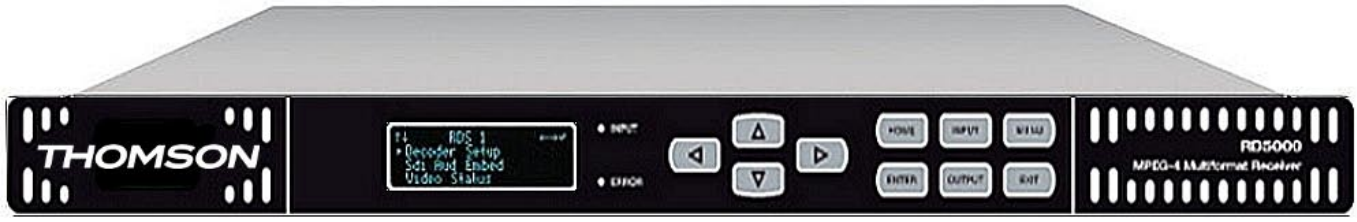
Section 4 – Using the Front Panel to Configure the unit



Introduction

This section describes how to navigate through the configuration menus on the front panel of the unit.

Note: All instructions in this manual are based on the unit software versions 7.6.x. Newer versions of software, when released, may operate slightly different in regards to menus and configuration.

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4.1 Input Option – Active Input and Backup Configuration Selection

General Information

The selection of the Active input and configuration of the Backup input are described in this section.

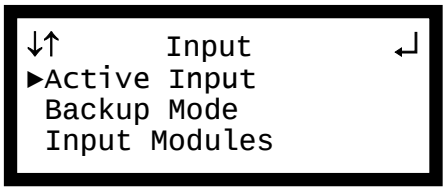
Supported Option Cards: NRD00HCSAA (8VSB Input interface), NRD00H02AA (ASI Input/Output), NRD00H04AA (COFDM Input) and NRD00H05AA (MPEG over IP Input/Output).

Description: The Active input specifies the card that is being used as the input option. The Backup configuration enables/disables the switching to a backup input, defines the Primary Input and Backup Input, when to restore to the Primary Input and a timeout before switching to the Backup Input or restoring to the Primary Input.

Changing the Active Input

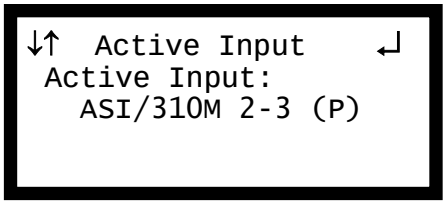
To set an Active Input, use the following steps:

1. Press the INPUT button.

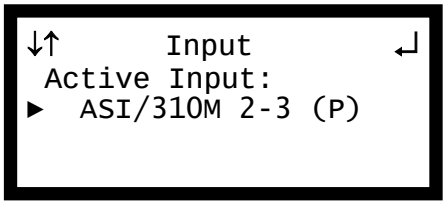


Note: For dual units, select RDS1 or RDS2, then press ENTER.

2. Press the ENTER button to edit the Active Input. The current Active Input is displayed along with a "(P)" for Primary or "(B)" for Backup if the Backup Mode in enabled.
3. Press the ENTER button again to edit the Active Input.



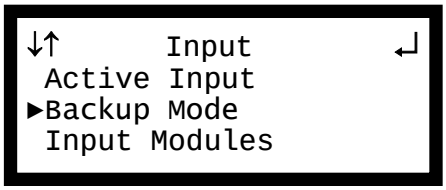
4. Press the ENTER button again to use the △ and ▽ buttons to change the Active Input selection, then press the ENTER button to save the selection.



Note: When Backup Mode is enabled, only the Primary or Backup input option can be made the active input. If Backup Mode is disabled, any installed input option can be made the active input.

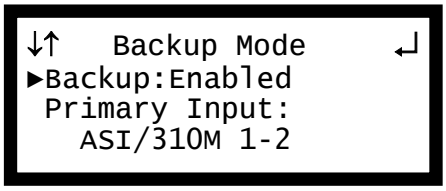
Configuring Input Backup Settings

1. Press the INPUT button.
2. Use the △ and ▽ buttons to move the cursor to “Backup Mode”, then press the ENTER button.
3. Press the ENTER button again to edit the Backup settings.



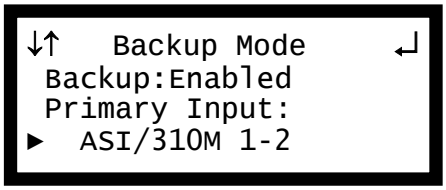
Setting the Backup Mode

1. Use the △ and ▽ buttons to move the cursor to “Backup:”, then press the ENTER button.
2. Use the △ and ▽ buttons to select “Enabled” or Disabled” and then press the ENTER button to save the selection.



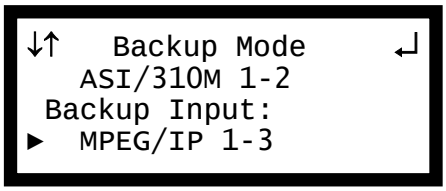
Setting the Primary Input

1. Use the △ and ▽ buttons to move the cursor to the input shown as the Primary Input, then press the ENTER button.
2. Use the △ and ▽ buttons to select the input option to use as the Primary and then press the ENTER button to save the selection.



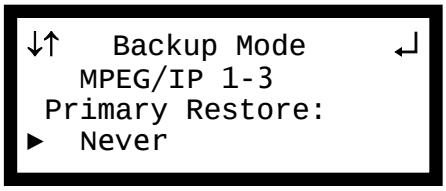
Setting the Backup Input

1. Use the △ and ▽ buttons to move the cursor to the input shown as the Backup Input, then press the ENTER button.
2. Use the △ and ▽ buttons to select the input option to use as the Backup and then press the ENTER button to save the selection.



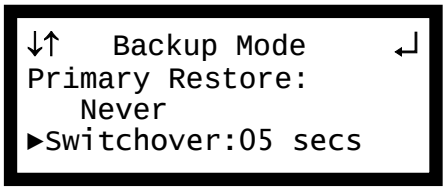
Setting the Primary Restore Setting

1. Use the △ and ▽ buttons to move the cursor to the “Primary Restore” setting, then press the ENTER button.
2. Use the △ and ▽ buttons to select “Never”, “When Primary Rtns” or “On Backup Failure”, then press the ENTER button to save the selection.



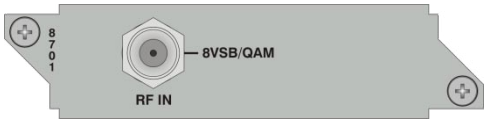
Setting the Backup Timeout Setting

1. Use the △ and ▽ buttons to move the cursor to the “Switchover:” setting, then press the ENTER button.
2. Use the ◁ and ▷ buttons to select the column to edit and use the △ and ▽ buttons to set the value of the timeout (3 – 45 seconds), then press the ENTER button to save the selection.



4.2 8VSB/QAM Receiver – Option NRD00HCSAA

General Information



Install Location: Any slot *except* 1-1 and 2-1.

I/O: (1) 75Ω Female F Connector

Supported Formats: 8VSB, QAM64B, QAM256B

Description: This card provides demodulation of 8VSB or QAM. For 8VSB the card is able to tune to channels 2-69 on UHF/VHF and channels 2-134 on the cable channel bands of FCC cable, IRC, and HRC. For QAM, the card is able to receive both QAM64B and QAM256B and is able to tune to channels 2-134 in the cable bands of FCC cable, IRC, and HRC.

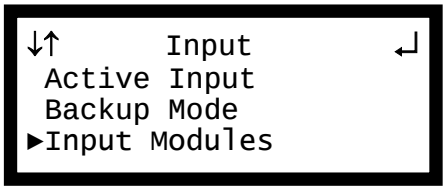
To Edit the Option Card Input Settings

To edit this input card, use the following steps:

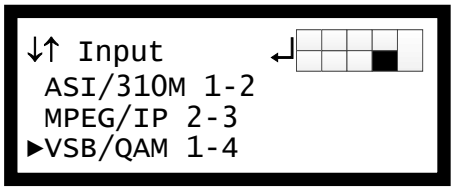
1. Press the INPUT button.

Note: For dual units, select RDS1 or RDS2, then press ENTER.

2. Use the △ and ▽ buttons to select “Input Modules”, and press the ENTER button.

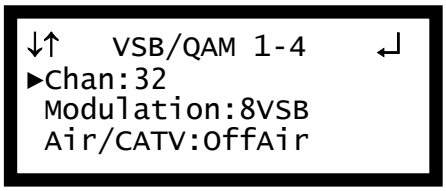


3. Use the △ and ▽ buttons to move the cursor to the “VSB/QAM” card of the specific slot (e.g. 1-4). Notice the location diagram in the upper right corner of the screen changes as the cursor moves by each card.
4. Press the ENTER button once to display the Status screen for the VSB/QAM card.
5. Press the ENTER button again to display the Edit screen for the VSB/QAM card.



Channel

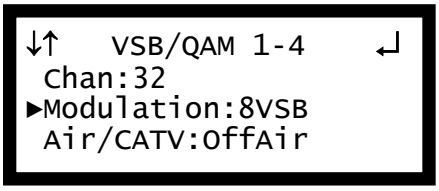
1. Use the △ and ▽ buttons to move the cursor to “Chan:” then press the ENTER button.
2. Use the △ and ▽ buttons to tune to the specific RF channel of interest, then press the ENTER button to save the selection.



Note: The Channel selection is (2 – 69) for “Air/CATV:” set to “OffAir”, and (2 – 134) for the other “AirCATV:” settings.

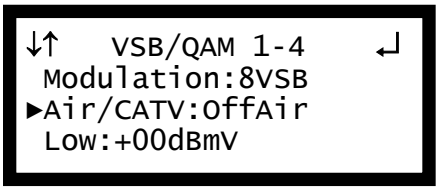
Modulation

1. Use the △ and ▽ buttons to move the cursor to “Modulation:” then press the ENTER button.
2. Use the △ and ▽ buttons to choose the appropriate modulation type (“8VSB”, “QAM64B”, “QAM256B”), then press the ENTER button to save the selection.



Channel Bands

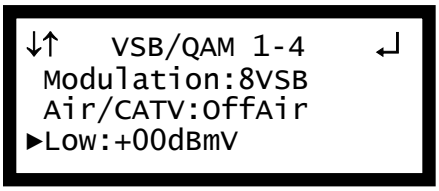
1. Use the △ and ▽ buttons to move the cursor to “Air/CATV:” then press the ENTER button.
2. Use the △ and ▽ buttons to choose the appropriate channel band (“OffAir”, “Cable-FCC”, “Cable-HRC”, “Cable-IRC”), then press the ENTER button to save the selection.



Set Low Signal and MER Error Levels

These two values are user defined threshold levels for the signal level and MER level. Once these values are set, if the input levels drops below the defined value, an error will be triggered which will cause the red “Error” LED to illuminate on the front panel, a description of the error will be shown in the “Active Errors” menu under the MENU button, and an entry will be logged in the event log.

1. Use the △ and ▽ buttons to move the cursor to “Low:” then press the ENTER button.
2. Use the ◁ and ▷ buttons to select the column to edit and use the △ and ▽ buttons to set the value of the low signal alarm threshold (-30dBmV - +40dBmV), then press the ENTER button to save the selection.

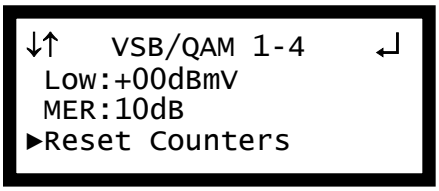


1. Use the △ and ▽ buttons to move the cursor to “MER:” then press the ENTER button.
2. Use the ◁ and ▷ buttons to select the column to edit and use the △ and ▽ buttons to set the value of the low MER alarm threshold (0dB – 40dB), then press the ENTER button to save the selection.

Reset FEC Error Counters

The unit counts the FEC errors on the input. These counters can be reset to “0” so that monitoring of the counts can beginning from a known reference point.

3. Use the △ and ▽ buttons to move the cursor to “Reset Counters” then press the ENTER button.
4. Press the ENTER button again to reset the FEC error counters.



4.3 Serial Transport Stream Input/Output (DVB-ASI/SMPTE 310M) – Option NRD00H02AA

General Information

Install Location: Any slot *except* 1-1 and 2-1.

I/O: (1) 75Ω Female BNC Input, (1) 75Ω Female BNC Output

Supported Formats: DVB-ASI, 310M

Description: This card provides either DVB-ASI or 310M input and output. The card will provide 310M output only if the input TS is 19.39 Mb/sec. When the card is in ASI mode, the TS bitrate for both the input and output is from 1.5 Mb/sec – 160 Mb/sec. When the card is in SMPTE 310M mode, the bitrate for both input and output must be 19.39 Mb/sec. The output will be the same type that the input is set for (e.g. 310M or ASI). When the card is in ASI mode, the ASI OUT will output the TS signal coming from the active input, whatever the input (ASI, DVB S/S2, IP...). If the active input is ASI IN, the ASI OUT will function as an active loop through. If the unit is powered off the loop through is inoperative. Up to 6 ASI cards can be installed in the unit, in order to provide duplicate TS streams.

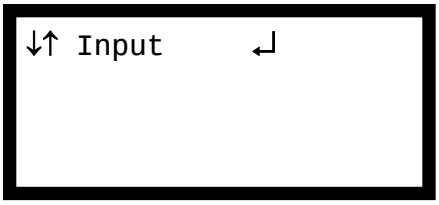
To Edit the Input Option

To edit this input card, use the following steps:

1. Press the INPUT button.

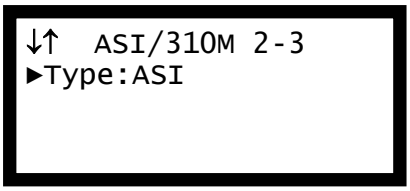
Note: For dual units, select RDS1 or RDS2, then press ENTER.

2. Select “Input Modules”, and press the ENTER button.
3. Use the △ and ▽ buttons to move the cursor to the “ASI/310M” card of the specific slot (e.g. 2-3). Notice the location diagram in the upper right corner of the screen changes as the cursor moves by each card.
4. Press the ENTER button once to display the Status screen for the ASI/310M card.
5. Press the ENTER button again to display the Edit screen for the ASI/310M card.



Input Type

1. Use the △ and ▽ buttons to move the cursor to “Type:” then press the ENTER button.
2. Use the △ and ▽ buttons to select the appropriate input (“ASI”, “310M”), then press the ENTER button to save the selection.



4.4 Video Output (1 RGBHV/YPbPr, 1 Composite) - Option NRD00H09AA

General Information

Install Location: 1-1 or (2-1 only on dual units)

I/O: (1) 75Ω Female BNC NTSC/PAL Composite output, (1) 15-pin D-sub Female analog output

Supported Formats: NTSC/PAL Composite, YPbPr, RGBHV

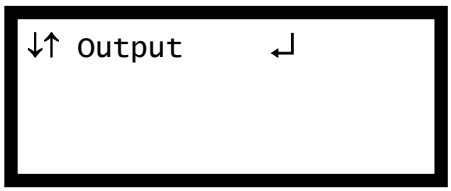
Description: Analog only, video output card that can output either high definition or standard definition formats. There are two outputs on the card. One BNC for composite and one 15-pin D-sub for composite.

Output Control

1. Press the OUTPUT button.

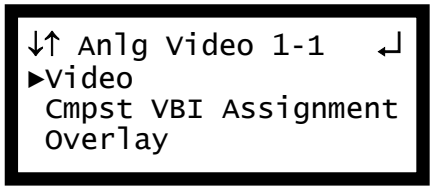
Note: For dual units, select RDS1 or RDS2, then press ENTER.

2. Use the △ and ▽ buttons to move the cursor to the "Anlg Video" card of the specific slot (e.g. 1-1), then press the ENTER button. Notice the location diagram in the upper right corner of the screen changes as the cursor moves by each card.



Video Settings

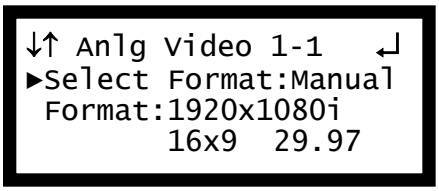
1. Use the △ and ▽ buttons to move the cursor to "Video", then press the ENTER button to display the Video status screen for the video output card.
2. Press the ENTER button again to display the Edit screen for the video output card.



Select Format Setting

When in "Auto" mode, the unit will automatically pick the format which is closest to the native format of the decoded video in the elementary stream. When in "Manual" mode, the format may be selected from the list of available output formats listed under "Video Format" below.

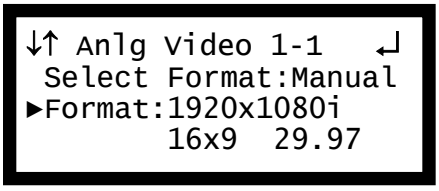
1. Use the △ and ▽ buttons to move the cursor to "Select Format:" then press the ENTER button.
2. Use the △ and ▽ buttons to select either "Auto" or "Manual" mode, then press the ENTER button to save the selection.



Video Format

Note: This menu is only available if the "Select Format" option is set to "Manual."

1. Use the △ and ▽ buttons to move the cursor to "Format:" then press the ENTER button.
2. Use the △ and ▽ buttons to select the appropriate output format, then press the ENTER button to save the selection.

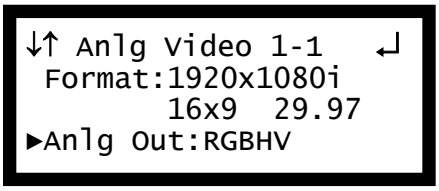


720x480i	16x9	29.97	1280x720p	16x9	59.94
720x480i	4x3	29.97	1280x720p	16x9	60.00
720x576i	16x9	25.00	1920x1080i	16x9	25.00
720x576i	4x3	25.00	1920x1080i	16x9	29.97
1280x720p	16x9	50.00	1920x1080i	16x9	30.00

Analog Output Format

Note: If this setting is set incorrectly when using an RGB monitor, the image will appear green. If this setting is set incorrectly when using a Component monitor, there will be no video on the monitor.

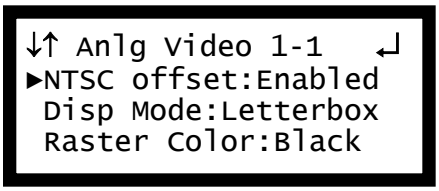
1. Use the △ and ▽ buttons to move the cursor to "Anlg Out:" then press the ENTER button.
2. Use the △ and ▽ buttons to select the desired output format ("RGBHV", "YPbPr"), then press the ENTER button to save the selection.



NTSC Ped

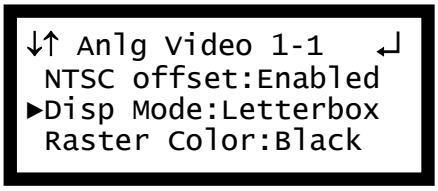
When the NTSC Ped is enabled it applies a 7.5 IRE offset to the black level of the Composite video output.

1. Use the △ and ▽ buttons to move the cursor to “Format:” then press the ENTER button.
2. Use the △ and ▽ buttons to select “Enabled” or “Disabled”, then press the ENTER button to save the selection.



Display Mode

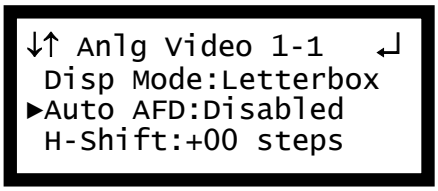
1. Use the △ and ▽ buttons to move the cursor to “Disp Mode:” then press the ENTER button.
2. Use the △ and ▽ buttons to select either “Letterbox” or “Cropped”, then press the ENTER button to save the selection.



Auto AFD

AFD or Active Format Description, is a standard set of codes that if sent in the MPEG transport stream is interpreted by the unit into a certain aspect ratio and active picture characteristics.

1. Use △ the ▽ and buttons to move the cursor to “Auto AFD:” then press the ENTER button.
2. Use △ the ▽ and buttons to select the appropriate mode (“Enabled” or “Disabled″), then press the ENTER button to save the selection.



Video Shift

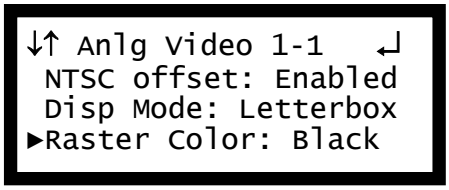
Video Shift provides a horizontal and vertical shift of the video output.

1. Use the △ and ▽ buttons to move the cursor to “H-shift:” then press the ENTER button.
2. Use the ◁ and ▷ buttons to select the column to edit and use the △ and ▽ buttons to change the horizontal step (-50 – +50 steps, where the minus direction moves the video down), then press the ENTER button to save the selection.

3. Use the △ and ▽ buttons to move the cursor to “V-shift:” then press the ENTER button.
4. Use the ◁ and ▷ buttons to select the column to edit and use the △ and ▽ buttons to change the vertical step (-50 – +50 steps, where the minus direction moves the video to the left), then press the ENTER button to save the selection.

Raster Color

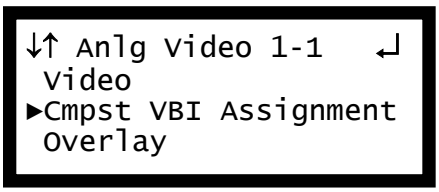
1. Use the △ and ▽ buttons to move the cursor to “Raster Color:” then press the ENTER button.
2. Use the △ and ▽ buttons to select the desired raster color (“Black”, “White”, “Yellow”, “Cyan”, “Green”, “Magenta”, “Red”, “Blue”), then press the ENTER button to save the selection.



Composite VBI Assignment

To edit the Composite VBI Assignment, use the following steps.

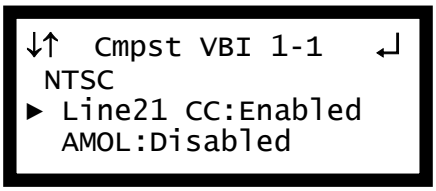
1. Use the △ and ▽ buttons to move the cursor to “Cmpst VBI Assignment” then press the ENTER button to display the status screen for the VBI.
2. Press the ENTER button once more to enter the Edit screen.



NTSC Waveforms

To enable NTSC items, use the following steps.

1. Use the △ and ▽ buttons to move the cursor to “Line21 CC:” then press the ENTER button.
2. Use the △ and ▽ buttons to select “Enabled” or “Disabled”, then press the ENTER button to save the selection.

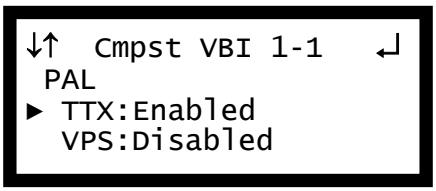


Note: Repeat steps 1-2 above to change AMOL, and TVG2x.

PAL Waveforms

To enable PAL items, use the following steps.

1. Use the △ and ▽ buttons to move the cursor to "TTX:" then press the ENTER button.
2. Use the △ and ▽ buttons to select "Enabled" or "Disabled", then press the ENTER button to save the selection.

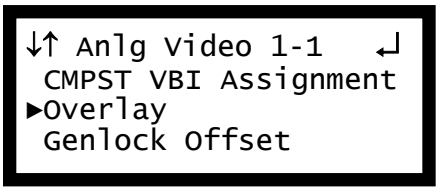


Note: Repeat steps 1-2 above to change VPS, and WSS.

Overlay Settings

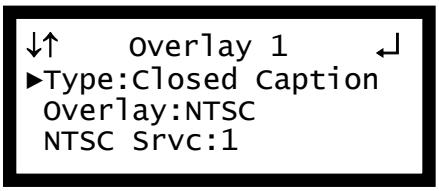
CAUTION: If Info (PSI/PSIP) data is turned on, the overlay will appear on downstream video. The same is true if Closed Caption overlay is turned on.

1. Use the △ and ▽ buttons to move the cursor to "Overlay", then press the ENTER button.



Type of Overlay

1. Use the △ and ▽ buttons to move the cursor to "Type:" then press the ENTER button.
2. Use the △ and ▽ buttons to select which overlay to display ("Off", "Closed Caption", "Service", "Table", "Subtitle") then press the ENTER button to save the selection.

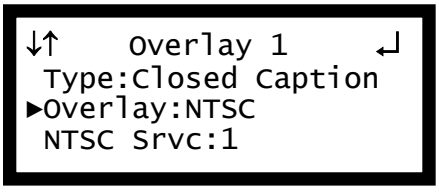


Note: The "1" in "Overlay 1" refers to the RDS.

Overlay (Closed Caption)

Note: This menu changes depending on which overlay is set in "Type of Overlay" above.

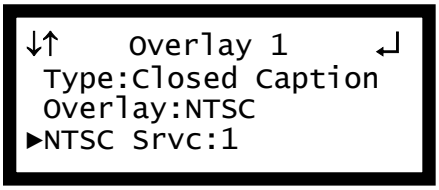
1. Use the △ and ▽ buttons to move the cursor to "Overlay:" then press the ENTER button.
2. Use the △ and ▽ buttons to select the appropriate type of overlay ("NTSC" or "DTVCC"), then press the ENTER button to save the selection.



NTSC Closed Captions

Note: This option will only be available if the TYPE of overlay is set to, "Closed Caption" and the "Overlay" is set to "NTSC."

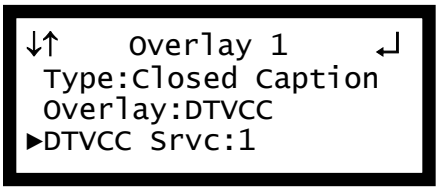
1. Use the △ and ▽ buttons to move the cursor to "NTSC Srvc:" then press the ENTER button.
2. Use the △ and ▽ buttons to select the desired number of closed caption to view (1-4), then press the ENTER button to save the selection.



DTVCC Closed Captions

Note: This option will only be available if the TYPE of overlay is set to, "Closed Caption" and the "Overlay" is set to "DTVCC."

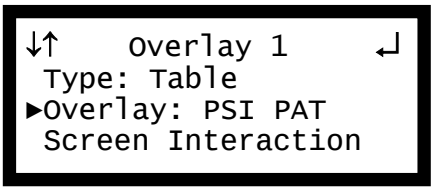
1. Use the △ and ▽ buttons to move the cursor to "DTVCC Srvc:" then press the ENTER button.
2. Use the △ and ▽ buttons to select the desired number of closed caption to view (1-7), then press the ENTER button to save the selection.



Overlay (Table)

Note: This menu changes depending on which overlay is set in "Overlay".

1. Use the △ and ▽ buttons to move the cursor to "Overlay:" then press the ENTER button.
2. Use the △ and ▽ buttons to select the appropriate type of overlay ("PSI PAT", "PSI PMT", "ATSC MGT", "ATSC STT", "ATSC TVCT", "ATSC EIT", "ATSC EPG"), then press the ENTER button to save the selection.

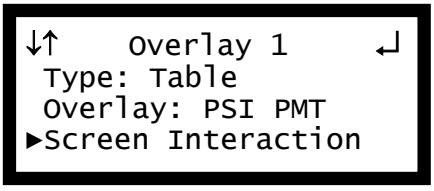


Screen Interaction

This mode allows the user to page through the on-screen PSI/ATSC tables.

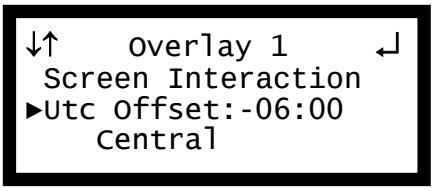
Note: This option will only be available if the type of overlay is set to, "Table."

1. Use the △ and ▽ buttons to move the cursor to "Screen Interaction", then press the ENTER button.
2. While this mode is enabled, the △, ▽, ◁, and ▷ buttons will control the on-screen PSI/ATSC tables. To exit the, "Screen Interaction" mode press the EXIT button.



Coordinated Universal Time Offset

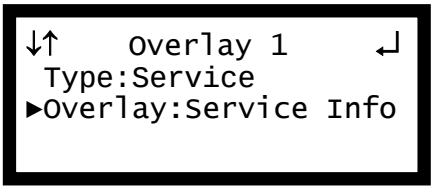
1. Use the △ and ▽ buttons to move the cursor to "Utc Offset:" then press the ENTER button.
2. Use the △ and ▽ buttons to change to the appropriate offset, then press the ENTER button to save the selection.



Note: The UTC values and their offsets are listed in Appendix E.

Overlay (Service)

Note: This option only displays the Service Info.

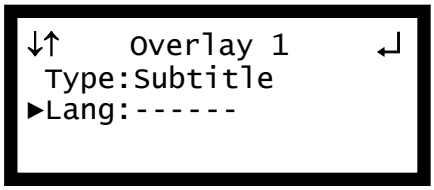


Overlay (Subtitle)

This overlays the DVB Subtitles. The subtitle is selected by choosing the language to display. Only the available languages that are present can be selected. When an input without DVB Subtitles is used, no language can be selected.

Note: This menu changes depending on which overlay is set in "Overlay".

1. Use the △ and ▽ buttons to move the cursor to "Lang:" then press the ENTER button.
2. Use the △ and ▽ buttons to select the language from those that are present, then press the ENTER button to save the selection.

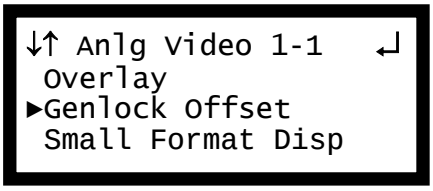


Genlock Offset

The NRD00H09AA card can be Genlocked to a standard "black and burst" signal applied to the Genlock input on the back panel. The frame rate of the "black and burst" signal must be the same as the frame rate of the video output. The "Genlock Reference," under the MENU button, must be set to the type of Genlock signal being used as well. If the Genlock input source is lost, the red "Error" LED will illuminate on the front panel, a description of the error will be shown in the "Active Errors" menu under the MENU button, and an entry will be logged in the event log. The video will restore but will not be Genlocked until the Genlock signal is restored.

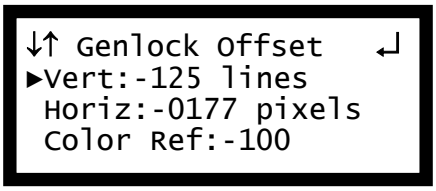
When the "Genlock Reference" is set to an SD source of NTSC or PAL, the "Genlock Offset" includes a "Color Ref" setting.

1. Use the △ and ▽ buttons to move the cursor to “Genlock Offset,” then press the ENTER button.



Vertical

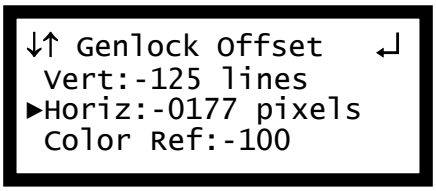
1. Use the △ and ▽ buttons to move the cursor to “Vert:” then press the ENTER button.
2. Use the ◁ and ▷ buttons to select the column to edit and use the △ and ▽ buttons to change the number of lines, then press the ENTER button to save the selection.



Note: The maximum amount of offset is determined by the format of the video set.

Horizontal

1. Use the △ and ▽ buttons to move the cursor to “Horiz:” then press the ENTER button.
2. Use the ◁ and ▷ buttons to select the column to edit and use the △ and ▽ buttons to change the number of pixels, then press the ENTER button to save the selection.

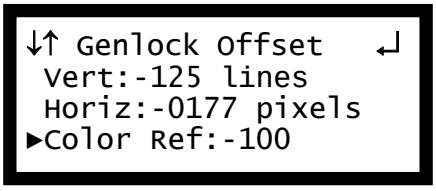


Note: The maximum amount of offset is determined by the format of the video set.

Color Reference

Note: The Color Reference is only available when the Genlock reference is SD.

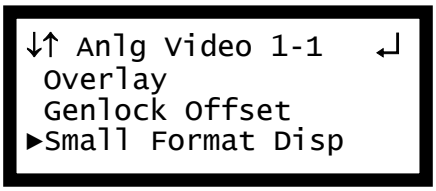
1. Use the △ and ▽ buttons to move the cursor to “Color ref:” then press the ENTER button.
2. Use the ◁ and ▷ buttons to select the column to edit and use the △ and ▽ buttons to change the number of degrees (-180 – +180), then press the ENTER button to save the selection.



Small Format Display

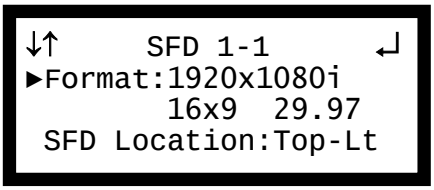
To setup the unit to output a “Small Format Display”, use the following steps:

1. Use the △ and ▽ buttons to move the cursor to “Small Format Disp”, then press the ENTER button.
2. Press the ENTER button again to change the settings.



Format

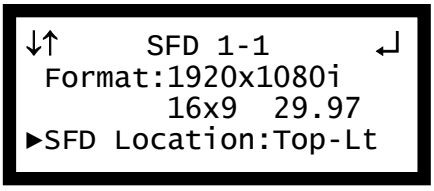
1. While the cursor is on “Format:” press the ENTER button to change the display format.
2. Use the △ and ▽ buttons to change from any of the format settings.
3. Press the ENTER button to save the settings.



720x480i	16x9	29.97	1280x720p	16x9	59.94
720x480i	4x3	29.97	1280x720p	16x9	60.00
720x576i	16x9	25.00	1920x1080i	16x9	25.00
720x576i	4x3	25.00	1920x1080i	16x9	29.97
1280x720p	16x9	50.00	1920x1080i	16x9	30.00

SFD Location

1. Use the △ and ▽ button to move the cursor to “SFD Location:” and then press the ENTER button.
2. Use the △ and ▽ buttons to select one of “Top-Lt”, “Mid-Lt”, “Btm-Lt”, Top-Rt”, “Mid-Rt”, “Btm-Rt”, Top-Ctr”, “Mid-Ctr”, “Btm-Ctr”.
3. Press the ENTER button to save the settings.



4.5 Audio Output (DolbyE, AES Digital, Analog) – Option NRD00HA0AA

General Information

Install Location: Any slot *except* 1-1 and 2-1.

I/O: (2) 75Ω Female BNC digital outputs, (1) 15-pin D-sub Male analog output

Supported Formats: Raw, PCM, Dolby E

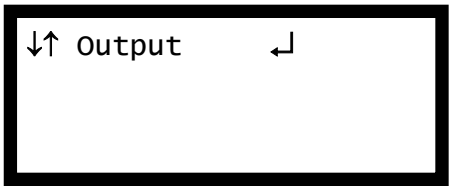
Description: This card provides two digital audio outputs, and two analog audio pair outputs. The NRD00HA0AA also adds the ability to parse DolbyE compressed audio. It provides the audio from two audio decoder processors. Embedded DolbyE on SDI outputs does require this NRD00HA0AA option. Other embedded audio types on SDI outputs does not require this NRD00HA0AA option.

Output Control

1. Press the OUTPUT button.

Note: For dual units, select RDS1 or RDS2, then press ENTER.

2. Use the △ and ▽ buttons to move the cursor to the "Audio" card of the specific slot (e.g. 2-2), then press the ENTER button. Notice the location diagram in the upper right corner of the screen changes as the cursor moves by each card.
3. Press the ENTER button one more time to move from the Status screen to the Edit screen.



Digital Audio Settings

1. Use the △ and ▽ buttons to move the cursor to "Out1:" then press the ENTER button.
2. Use the △ and ▽ buttons to select the audio decoder and output format desired ("Audio 1 – PCM", "Audio 1 – Raw", "Audio 2 – PCM", "Audio 2 - Raw", "Off"), then press the ENTER button to save the selection.

Note: The above steps apply to "Out2:" as well.

Note: In case of option NRD00H07AA (up to 4 audio channels) the additional values of "Audio 3 – PCM", "Audio 3 – Raw", "Audio 4 – PCM", "Audio 4 - Raw" are available.

Analog Audio Settings

1. Use the △ and ▽ buttons to move the cursor to "Ch1:" then press the ENTER button.
2. Use the △ and ▽ buttons to select the desired audio to output (Audio X), then press the ENTER button to save the selection.

Note: The "X" of "Audio X," in the step above, will be according to the configuration of the unit.

.

Output Level

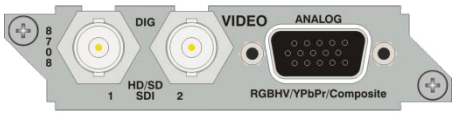
Note: This setting is only available on the NRD00HA0AA option card.

1. Use the △ and ▽ buttons to move the cursor to "Level:" then press the ENTER button.
2. Use the △ and ▽ buttons to select the desired level (1-9), then press ENTER to save the selection.

Note: The level 7 is approximately 0 dBu (when using a -20 dBFS reference level, see Appendix F) and each number increment is approx. 2.5 dB. Level 9 is approximately +4 dBu (when using a -20 dBFS reference level, see Appendix F).

4.6 Dual Video Output (2 SD/HD SDI, 1 RGBHV/YPbPr/Composite) – Option NRD00H06AA

General Information



Install Location: 1-1 or (2-1 only on dual units or single units with option up to 4 audio channels NRD00H07AA)

I/O: (2) 75Ω HD-SDI Female BNC outputs, (1) 15-pin D-sub Female analog output

Supported Formats: HD-SDI, SD-SDI, YPbPr, RGBHV, and Composite

Description: This card provides three mirrored outputs from any of the available input option cards. Two of the outputs are any combination of HD-SDI or SD-SDI and one is analog YPbPr/RGBHV/Composite.

Output Control

1. Press the OUTPUT button.
2. Use the △ and ▽ buttons to move the cursor to the "HD/SD SDI Anlg Video" card of the specific slot (e.g. 2-1). Notice the location diagram in the upper right corner of the screen changes as the cursor moves by each card.

```
↓↑ Output      ↵
```

Video Settings

1. Use the △ and ▽ buttons to move the cursor to "Video", then press the ENTER button to display the Video Status screen for the video output card.
2. Press the ENTER button again to display the Edit screen for the video output card.

```
↓↑SDI Anlg Vid 2-1  ↵
►Video
 HD Settings
 SD Settings
```

Select Format Setting

When in "Auto" mode, the unit will automatically pick the format which is closest to the native format of the decoded video in the elementary stream. When in "Manual" mode, the format may be selected from the list of available output formats listed under "Video Format" below.

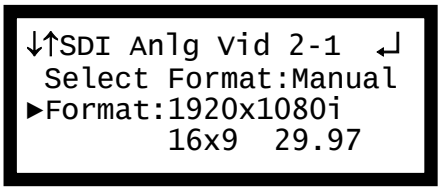
1. Use the △ and ▽ buttons to move the cursor to "Select Format:" then press the ENTER button.
2. Use the △ and ▽ buttons to select either "Auto" or "Manual" mode, then press the ENTER button to save the selection.

```
↓↑SDI Anlg Vid 2-1  ↵
►Select Format:Manual
 Format:1920x1080i
        16x9  29.97
```

Video Format

Note: This menu is only available if the "Select Format" option is set to "Manual."

1. Use the △ and ▽ button to move the cursor to "Format:" then press the ENTER button.
2. Use the △ and ▽ buttons to select the desired output format, then press the ENTER button to save the selection.

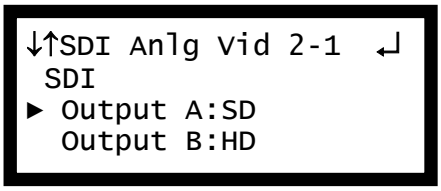


720 x 480i	16x9	29.97	1920 x 1080i	16x9	30.00
720 x 480i	4x3	29.97	1920 x 1080PsF	16x9	23.98
720 x 576i	4x3	25.00	1920 x 1080PsF	16x9	24.00
720 x 576i	16x9	25.00	1920 x 1080p	16x9	23.98
1280 x 720p	16x9	60.00	1920 x 1080p	16x9	24.00
1280 x 720p	16x9	59.94	1920 x 1080p	16x9	25.00
1280 x 720p	16x9	50.00	1920 x 1080p	16x9	29.97
1920 x 1080i	16x9	25.00	1920 x 1080p	16x9	30.00
1920 x 1080i	16x9	29.97			

SDI Output Setup

Follow the steps in this section to set the outputs to SD-SDI and HD-SDI.

1. Use the △ and ▽ button to move the cursor to "Output A:" then press the ENTER button.
2. Use the △ and ▽ buttons to select the desired output format ("Auto", "SD", "HD"), then press the ENTER button to save the selection.

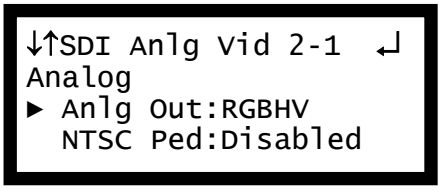


Note: Repeat the steps above to change to the desired output setting for "Output B:"

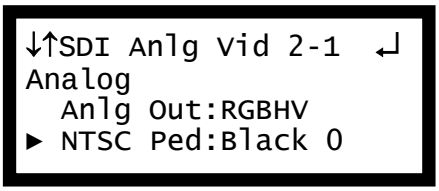
Analog Output Format

Note: If this setting is set incorrectly when using an RGB monitor, the image will appear green. If this setting is set incorrectly when using a Component monitor, there will be no video on the monitor.

1. Use the △ and ▽ buttons to move the cursor to "Anlg Out:" then press the ENTER button.
2. Use the △ and ▽ buttons to select the desired output format ("RGBHV", "YPbPr", "RGB SoG"), then press the ENTER button to save the selection.



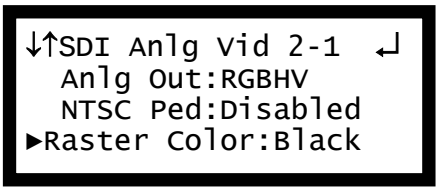
1. Use the △ and ▽ buttons to move the cursor to “NTSC Ped:” then press the ENTER button.
2. Use the △ and ▽ buttons to change the “NTSC Ped:” to either “Black 0” or “Black 7.5”, then press the ENTER button to save the selection.



Raster Color

This setting determines the color of the raster that is output by the decoder when input is lost.

1. Use the △ and ▽ buttons to move the cursor to “Raster Color:” then press the ENTER button.
2. Use the △ and ▽ buttons to select the desired raster color (“Black”, “White”, “Yellow”, “Cyan”, “Green”, “Magenta”, “Red”, “Blue”), then press the ENTER button to save the selection.



HD Settings

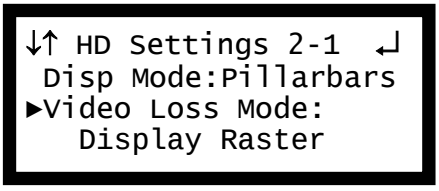
1. Use the △ and ▽ buttons to move the cursor to “HD Settings”, then press the ENTER button to display the Status screen for the HD video output settings.
2. Press the ENTER button again to display the Edit screen for the HD video output settings.

Display Mode

1. Use the △ and ▽ buttons to move the cursor to “Disp Mode:” then press the ENTER button.
2. Use the △ and ▽ buttons to select the desired output size (“Pillarbars”, “Cropped”), then press the ENTER button to save the selection.

Video Loss Mode

1. Use the △ and ▽ buttons to move the cursor to “Video Loss Mode:” then press the ENTER button.
2. Use the △ and ▽ buttons to choose between (“Display Raster”, “Disable Output”), then press the ENTER button to save the selection.



Auto AFD

1. Use the △ and ▽ buttons to move the cursor to “Auto AFD:” then press the ENTER button.
2. Use the △ and ▽ buttons to set “Enabled” or “Disabled”, then press the ENTER button to save the selection.

Video Shift

Video Shift provides a horizontal and vertical shift of the video output.

1. Use the △ and ▽ buttons to move the cursor to “H-shift:” then press the ENTER button.
2. Use the ◁ and ▷ buttons to select the column to edit and use the △ and ▽ buttons to change the horizontal step (-50 – +50 steps, where the minus direction moves the video down), then press the ENTER button to save the selection.
3. Use the △ and ▽ buttons to move the cursor to “V-shift:” then press the ENTER button.
4. Use the ◁ and ▷ buttons to select the column to edit and use the △ and ▽ buttons to change the vertical step (-50 – +50 steps, where the minus direction moves the video to the left), then press the ENTER button to save the selection.

SDI VANC Assignment

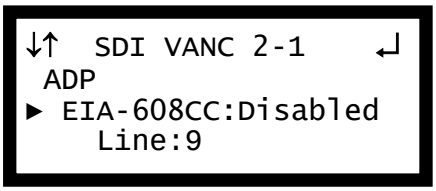
To edit the SDI VANC Assignment, use the following steps.

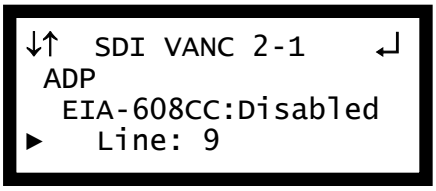
1. Use the △ and ▽ buttons to move the cursor to “SDI VANC Assign” then press the ENTER button to display the status screen for the VANC.
2. Press the ENTER button once more to enter the Edit screen.

Ancillary Data Packets

This controls the embedding to the Ancillary Data Packets (ADP) into the VANC of the SDI output.

1. Use the △ and ▽ buttons to move the cursor to the desired type of Ancillary Data Packet (“EIA-608CC”, “EIA-708CC”, “TTX S2031M”, “Source ID”, or “SCTE 127”, “AFD”), then press the ENTER button.
2. Use the △ and ▽ buttons to choose “Enabled” or “Disabled”, then press the ENTER button to save the selection.
3. Use the △ and ▽ buttons to select “Line:” for the ADP and press the ENTER button.
4. Use the △ and ▽ buttons to change the line number (4 – 15) in which the ancillary data will be located.





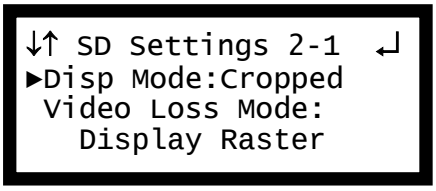
Note: Repeat steps 1-4 above to change EIA-708CC, TTX S2031M, Source ID, SCTE 127 and AFD.

SD Settings

1. Use the △ and ▽ buttons to move the cursor to “SD Settings”, then press the ENTER button to display the Status screen for the SD video output settings.
2. Press the ENTER button again to display the Edit screen for the SD video output settings.

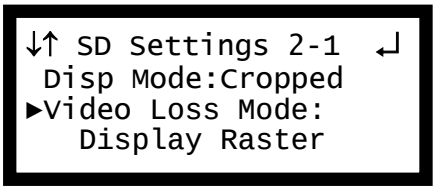
Display Mode

1. Use the △ and ▽ buttons to move the cursor to “Disp Mode:” then press the ENTER button.
2. Use the △ and ▽ buttons to select the desired output size (“Letterbox”, “Anamorph”, or “Cropped”), then press the ENTER button to save the selection.



Video Loss Mode

1. Use the △ and ▽ buttons to move the cursor to “Video Loss Mode:” then press the ENTER button.
2. Use the △ and ▽ buttons to choose between (“Display Raster”, “Disable Output”), then press the ENTER button to save the selection.



Auto AFD

1. Use the △ and ▽ buttons to move the cursor to “Auto AFD:” then press the ENTER button.
2. Use the △ and ▽ buttons to enable or disable AFD, then press the ENTER button to save the selection.

Video Shift

Video Shift provides a horizontal and vertical shift of the video output.

1. Use the △ and ▽ buttons to move the cursor to “H-shift:” then press the ENTER button.
2. Use the ◁ and ▷ buttons to select the column to edit and use the △ and ▽ buttons to change the horizontal step (-50 – +50 steps, where the minus direction moves the video down), then press the ENTER button to save the selection.

3. Use the △ and ▽ buttons to move the cursor to “V-shift:” then press the ENTER button.
4. Use the ◁ and ▷ buttons to select the column to edit and use the △ and ▽ buttons to change the vertical step (-50 – +50 steps, where the minus direction moves the video to the left), then press the ENTER button to save the selection.

SDI VANC Assignment

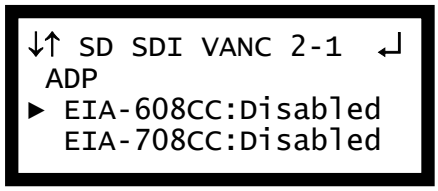
To edit the SDI VANC Assignment, use the following steps.

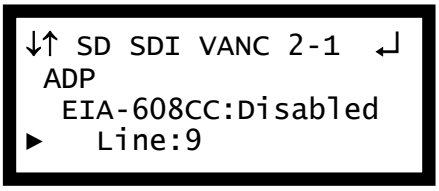
1. Use the △ and ▽ buttons to move the cursor to “SDI VANC Assign” then press the ENTER button to display the status screen for the VANC.
2. Press the ENTER button once more to enter the Edit screen.

Ancillary Data Packets

This controls the embedding of the Ancillary Data Packets (ADP) into the VANC of the SDI output.

1. Use the △ and ▽ buttons to move the cursor to the desired type of Ancillary Data Packet (“EIA-608CC”, “EIA-708CC”, “TTX S2031M”, “Source ID”, or “SCTE 127”, “AFD”), then press the ENTER button.
2. Use the △ and ▽ buttons to choose “Enabled” or “Disabled”, then press the ENTER button to save the selection.
3. Use the △ and ▽ buttons to select “Line:” for the ADP and press the ENTER button.
4. Use the △ and ▽ buttons to change the line number (4 – 15) in which the ancillary data will be located, then press the ENTER button.



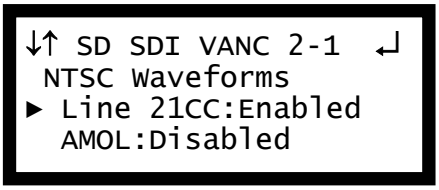


Note: Repeat steps 1-4 above to change EIA-708CC, TTX S2031M, Source ID, SCTE 127 and AFD.

NTSC Waveforms

To enable NTSC items, use the following steps.

1. Use the △ and ▽ buttons to move the cursor to “Line 21CC:” then press the ENTER button.
2. Use the △ and ▽ buttons to select “Enabled” or “Disabled”, then press the ENTER button to save the selection.

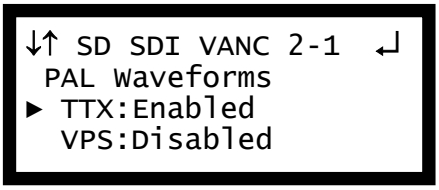


Note: Repeat steps 1-2 above to change AMOL and TVG2x.

PAL Waveforms

To enable PAL items, use the following steps.

1. Use the △ and ▽ buttons to move the cursor to “TTX:” then press the ENTER button.
2. Use the △ and ▽ buttons to select “Enabled” or “Disabled”, then press the ENTER button to save the selection.

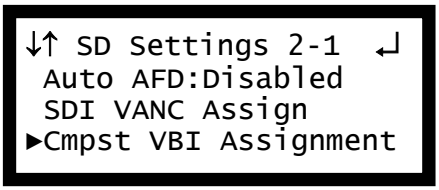


Note: Repeat steps 1-2 above to change VPS and WSS.

Composite VBI Assignment

To edit the Composite VBI Assignment, use the following steps.

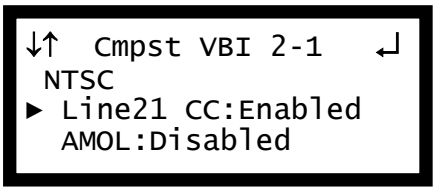
1. Use the △ and ▽ buttons to move the cursor to "Cmpst VBI Assignment" then press the ENTER button to display the status screen for the VBI.
2. Press the ENTER button once more to enter the Edit screen.



NTSC Waveforms

To enable NTSC items, use the following steps.

1. Use the △ and ▽ buttons to move the cursor to "Line21 CC:" then press the ENTER button.
2. Use the △ and ▽ buttons to select "Enabled" or "Disabled", then press the ENTER button to save the selection.

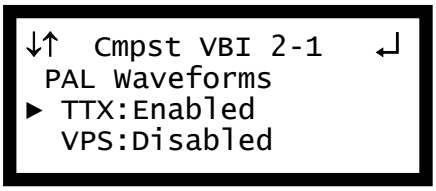


Note: Repeat steps 1-2 above to change AMOL, and TVG2x.

PAL Waveforms

To enable PAL items, use the following steps.

1. Use the △ and ▽ buttons to move the cursor to "TTX:" then press the ENTER button.
2. Use the △ and ▽ buttons to select "Enabled" or "Disabled", then press the ENTER button to save the selection.



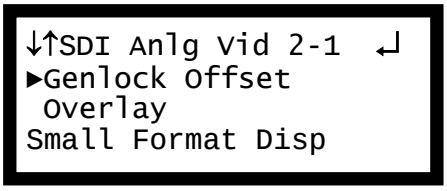
Note: Repeat steps 1-2 above to change VPS, and WSS.

Genlock Offset

The NRD00H06AA card can be Genlocked to a standard "black and burst" signal applied to the Genlock input on the back panel. The frame rate of the "black and burst" signal must be the same as the frame rate of the video output. The "Genlock Reference," under the MENU button, must be set to the type of Genlock signal being used as well. If the Genlock input source is lost, the red "Error" LED will illuminate on the front panel, a description of the error will be shown in the "Active Errors" menu under the MENU button, and an entry will be logged in the event log. The video will restore but will not be Genlocked until the Genlock signal is restored.

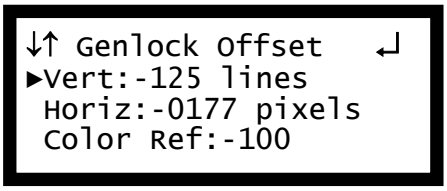
When the "Genlock Reference" is set to an SD source of NTSC or PAL, the "Genlock Offset" includes a "Color Ref" setting.

1. Use the △ and ▽ buttons to move the cursor to “Genlock Offset,” then press the ENTER button.



Vertical

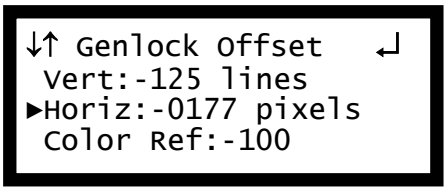
1. Use the △ and ▽ buttons to move the cursor to “Vert:” then press the ENTER button.
2. Use the ◁ and ▷ buttons to select the column to edit and use the △ and ▽ buttons to change the number of lines, then press the ENTER button to save the selection.



Note: The maximum amount of offset is determined by the format of the video set.

Horizontal

1. Use the △ and ▽ buttons to move the cursor to “Horiz:” then press the ENTER button.
2. Use the ◁ and ▷ buttons to select the column to edit and use the △ and ▽ buttons to change the number of pixels, then press the ENTER button to save the selection.

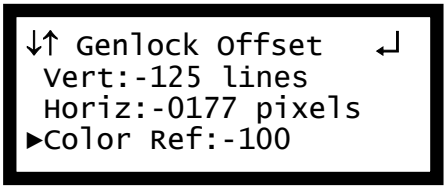


Note: The maximum amount of offset is determined by the format of the video set.

Color Reference

Note: The Color Reference is only available when the Genlock reference is SD.

1. Use the △ and ▽ buttons to move the cursor to “Color ref:” then press the ENTER button.
2. Use the ◁ and ▷ buttons to select the column to edit and use the △ and ▽ buttons to change the number of degrees (-180 – +180), then press the ENTER button to save the selection.



Overlay Settings

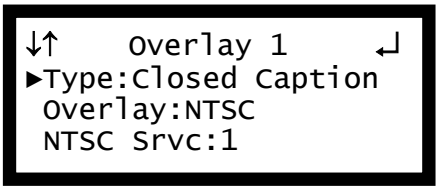
Overlays provide an easy way to help troubleshoot problems, monitor stream characteristics, or decode closed captioning.

CAUTION: All overlays will appear on the downstream video.

1. Use the △ and ▽ buttons to move the cursor to “Overlay”, then press the ENTER button.

Type of Overlay

3. Use the △ and ▽ buttons to move the cursor to “Type:” then press the ENTER button.
4. Use the △ and ▽ buttons to select which overlay to display (“Off”, “Closed Caption”, “Service”, “Table”, “Subtitle”) then press the ENTER button to save the selection.

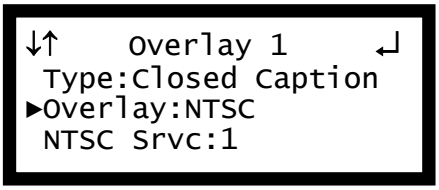


Note: The “1” in “Overlay 1” refers to the RDS.

Overlay (Closed Caption)

Note: This menu changes depending on which overlay is set in “Type of Overlay” above.

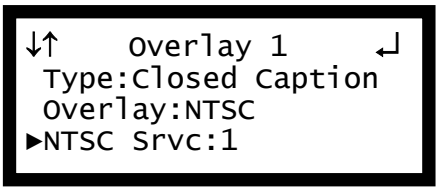
3. Use the △ and ▽ buttons to move the cursor to “Overlay:” then press the ENTER button.
4. Use the △ and ▽ buttons to select the appropriate type of overlay (“NTSC” or “DTVCC”), then press the ENTER button to save the selection.



NTSC Closed Captions

Note: This option will only be available if the TYPE of overlay is set to, “Closed Caption” and the “Overlay” is set to “NTSC.”

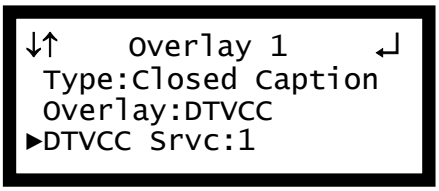
3. Use the △ and ▽ buttons to move the cursor to “NTSC Srvc:” then press the ENTER button.
4. Use the △ and ▽ buttons to select the desired number of closed caption to view (1-4), then press the ENTER button to save the selection.



DTVCC Closed Captions

Note: This option will only be available if the TYPE of overlay is set to, "Closed Caption" and the "Overlay" is set to "DTVCC."

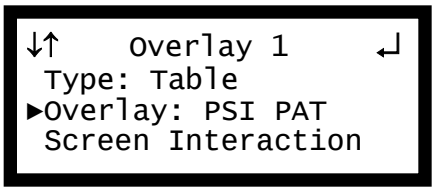
3. Use the △ and ▽ buttons to move the cursor to "DTVCC Srvc:" then press the ENTER button.
4. Use the △ and ▽ buttons to select the desired number of closed caption to view (1-7), then press the ENTER button to save the selection.



Overlay (Table)

Note: This menu changes depending on which overlay is set in "Overlay".

3. Use the △ and ▽ buttons to move the cursor to "Overlay:" then press the ENTER button.
4. Use the △ and ▽ buttons to select the appropriate type of overlay ("PSI PAT", "PSI PMT", "ATSC MGT", "ATSC STT", "ATSC TVCT", "ATSC EIT", "ATSC EPG"), then press the ENTER button to save the selection.

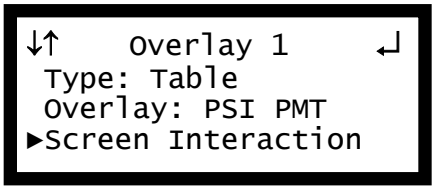


Screen Interaction

This mode allows the user to page through the on-screen PSI/ATSC tables.

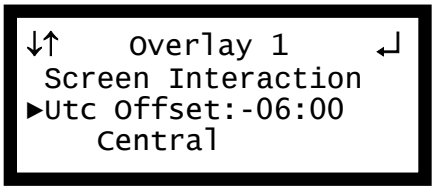
Note: This option will only be available if the type of overlay is set to, "Table."

3. Use the △ and ▽ buttons to move the cursor to "Screen Interaction", then press the ENTER button.
4. While this mode is enabled, the △, ▽, ◁, and ▷ buttons will control the on-screen PSI/ATSC tables. To exit the, "Screen Interaction" mode press the EXIT button.



Coordinated Universal Time Offset

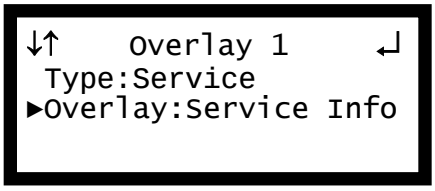
3. Use the △ and ▽ buttons to move the cursor to "Utc Offset:" then press the ENTER button.
4. Use the △ and ▽ buttons to change to the appropriate offset, then press the ENTER button to save the selection.



Note: The UTC values and their offsets are listed in Appendix E.

Overlay (Service)

Note: This option only displays the Service Info.

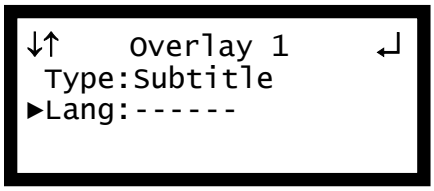


Overlay (Subtitle)

This overlays the DVB Subtitles. The subtitle is selected by choosing the language to display. Only the available languages that are present can be selected. When an input without DVB Subtitles is used, no language can be selected.

Note: This menu changes depending on which overlay is set in "Overlay".

3. Use the △ and ▽ buttons to move the cursor to "Lang:" then press the ENTER button.
4. Use the △ and ▽ buttons to select the language from those that are present, then press the ENTER button to save the selection.



Small Format Display

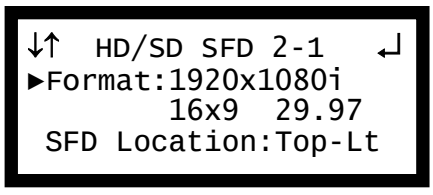
To setup the unit to output a "Small Format Display", use the following steps:

1. Use the △ and ▽ buttons to move the cursor to "Small Format Disp", then press the ENTER button.
2. Press the ENTER button again to change the settings.

Format

This output format is used whenever a small format (less than 720x480 or 720x567) is received. The small format video is placed in the output format specified here in the position defined by the "SFD Location" setting.

1. While the cursor is on "Output Format:" press the ENTER button to change the display format.
2. Use the △ and ▽ buttons to change from any of the format settings.
3. Press the ENTER button to save the settings.

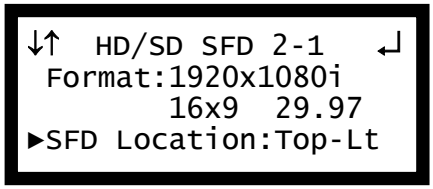


720 x 480i	16x9	29.97	1920 x 1080i	16x9	30.00
720 x 480i	4x3	29.97	1920 x 1080PsF	16x9	23.98
720 x 576i	4x3	25.00	1920 x 1080PsF	16x9	24.00

720 x 576i	16x9	25.00	1920 x 1080p	16x9	23.98
1280 x 720p	16x9	60.00	1920 x 1080p	16x9	24.00
1280 x 720p	16x9	59.94	1920 x 1080p	16x9	25.00
1280 x 720p	16x9	50.00	1920 x 1080p	16x9	29.97
1920 x 1080i	16x9	25.00	1920 x 1080p	16x9	30.00
1920 x 1080i	16x9	29.97			

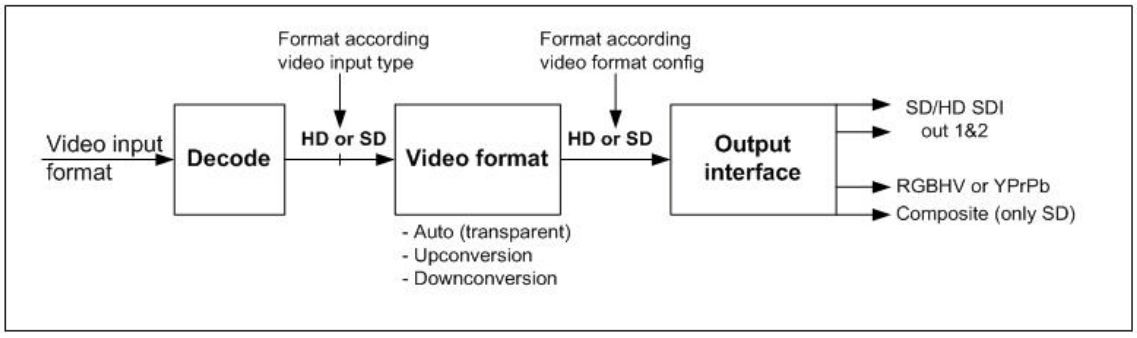
SFD Location

1. Use the △ and ▽ button to move the cursor to “SFD Location:” and then press the ENTER button.
2. Use the △ and ▽ buttons to select one “Top-Lt”, “Mid-Lt”, “Btm-Lt”, “Top-Rt”, “Mid-Rt”, “Btm-Rt”, “Top-Ctr”, “Mid-Ctr”, “Btm-Ctr”, then press the ENTER button to save the settings.



Video outputs versus video input format and settings

Video input format (from input TS)	Video format configuration (configured by user)	SDI output (1 or 2)			RGBHV or YPrPb	Composite	Comment
		Auto	SD	HD			
SD or HD video input	Manual / HD profiles (1280x… or 1920x…)	HD SDI	No signal	HD SDI	Yes	No	If SD input => Decode & Upconversion If HD input => Decode
SD or HD video input	Manual / SD profiles (720x576i, 720x480i)	SD SDI	SD SDI	No signal	Yes	Yes	If SD input => Decode If HD input => Decode & Downconversion
HD video input	Auto	HD SDI	No signal	HD SDI	Yes	No	Decode
SD video input	Auto	SD SDI	SD SDI	No signal	Yes	Yes	Decode

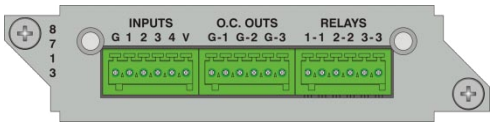


4.7 GPIO Module – Option NRD00H10AA

General Information

Install Location: Any slot *except* 1-1 or 2-1.

I/O: Logic Input, Open-Collector, and Relay Contact



Description: This module is considered a global unit option. In other words, the inputs and outputs of a single installed module can be accessed by functions associated with general system features, or RDS specific features in any unit configuration. Only one GPIO module can be installed in a unit.

DTMF Tones

To setup the unit to interpret a contact closure from a receiver (getting DTMF analog cue tones) and output an embedded SCTE104 message in the SDI output, use the following steps:

1. Press the MENU button.
2. Use the △ and ▽ buttons to move the cursor to “GPIO Module”, then press the ENTER button.

```
↓↑      Menu        ↵
 Event Log
►GPIO Module
 Splice Requests
```

3. Use the △ and ▽ buttons to move the cursor to “Input 1”, then press the ENTER button.

```
↓↑ GPIO Module 2-4  ↵
►Input 1:None
 Input 2:None
 Input 3:None
```

4. Use the △ and ▽ buttons to move the cursor to “Input 1”, then press the ENTER button.
5. Use the △ and ▽ buttons to select the message (“SCTE104 RDS1 1”, “SCTE104 RDS1 2”, “SCTE104 RDS1 3”, “SCTE104 RDS1 4”) that is to be inserted, then press the ENTER button to save the selection.

```
↓↑GPIO Input 2-4 1  ↵
►Input:SCTE104 RDS1 1
 Active State:High
```

Ex: SCTE104 RDS1 1 refers to splice request 1 that will be output on RDS1. In units with RDS2, the message options of “SCTE104 RDS2 1”, “SCTE104 RDS2 2”, “SCTE104 RDS2 3”, “SCTE104 RDS2 4” are also available.

6. Use the △ and ▽ buttons to move the cursor to “Active State”, then press ENTER button.
7. Use the △ and ▽ buttons to select the state (“High” or “Low”) in which the input will be considered active, then press the ENTER button to save the selection.

```
↓↑  GPIO Module 2-4 1  ↵
 Input 1:SCTE104 RDS1 1
►Active State:High
```

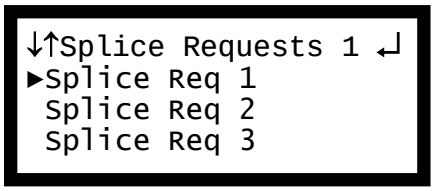
Note: The aforementioned steps apply to the configuration of "Inputs 1-4, Outputs 1-3, and Relays 1-3" as well.

Splice Request Setup

Once the Input is setup the outgoing SCTE104 messages need to be configured. Use the following steps to configure the outgoing SCTE104 messages:

1. Press the MENU button.
2. Use the △ and ▽ buttons to move the cursor to "Splice Requests", and then press the ENTER button.

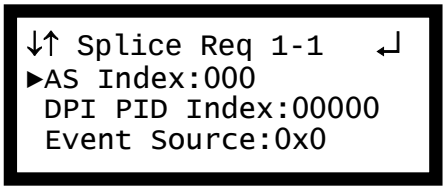
3. Use the △ and ▽ buttons to move the cursor to "Splice Req 1", and then press the ENTER button.



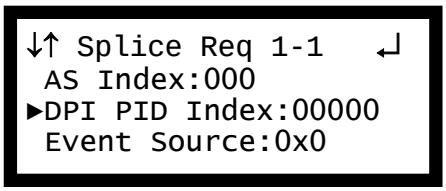
Note: The following steps apply to Splice Req 1 – 4.

Note: The number "1-1" in the header "Splice Req 1-1" refers to the RDS and the Splice Request 1. The second Splice request will be numbered "1-2".

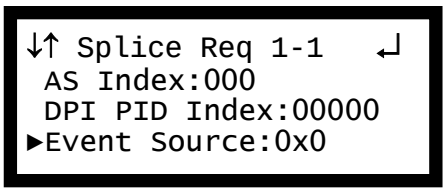
1. Use the △ and ▽, and the ◁ and ▷ buttons to set the "AS Index:" to the desired amount, and then press the ENTER button.



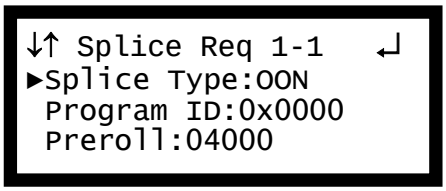
2. Use the △ and ▽, and the ◁ and ▷ buttons to set the "DPI PID Index:" to the desired amount, and then press the ENTER button.



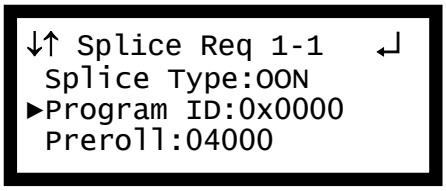
3. Use the △ and ▽, and the ◁ and ▷ buttons to set the "Event Source Index:" to the desired amount, and then press the ENTER button.



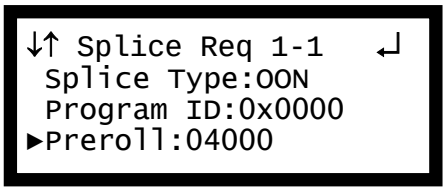
4. For the “Splice Type:” choose (“OON”, “OON Imm”, “RTN”, “RTN Imm”, or “Cancel) using the △ and ▽ buttons, and then press the ENTER button.



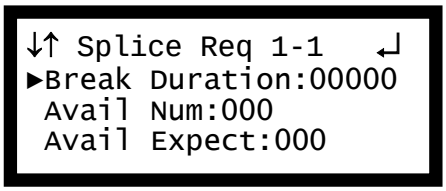
5. Use the △ and ▽, and the ◁ and ▷ buttons to set the “Program ID:” to the desired amount, and then press the ENTER button.



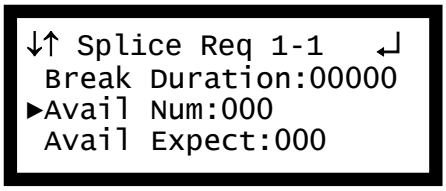
6. Use the △ and ▽, and the ◁ and ▷ buttons to set the “Preroll:” to the desired amount, and then press the ENTER button.



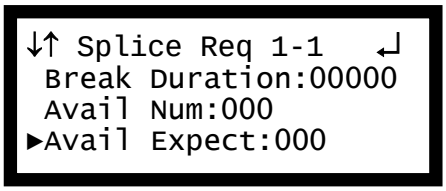
7. Use the △ and ▽, and the ◁ and ▷ buttons to set the “Break Duration:” to the desired amount, and then press the ENTER button.



8. Use the △ and ▽, and the ◁ and ▷ buttons to set the “Avail Num:” to the desired amount, and then press the ENTER button.



9. Use the △ and ▽, and the ◁ and ▷ buttons to set the “Avail Expect:” to the desired amount, and then press the ENTER button.



Note: The Web interface (see Section 5.3.2.5) uses the following names for the Splice Requests:

- *“Splice Event Source” for “Event Source”*
- *“Unique Program ID” for “Program ID”*
- *“Pre-Roll Time” for “Preroll”*
- *“Avails Expected” for “Avail Expect”*
- *“Splice Insert Type” for “Splice Type”, with values:*
  - *“Start Normal” for “OON”*
  - *“Start Immediate” for “OON Imm”*
  - *“End Normal” for “RTN”*
  - *“End Immediate” for “RTN Imm”*

Note: The “AS Index” ranges from 0 to 255 and uniquely identifies the source of the message. Enter the “AS Index” if one is present, otherwise leave blank (0).

Note: The "DPI PID Index" ranges from 0 to 65535 and is important when there are multiple DPI PIDs referenced by the PMT of one MPEG program. The user should take care to ensure the correct DPI PID and Video PID and PCR values (as indicated by the PMT) are configured on the unit so that the splice points and decoded video are properly associated. Enter the "DPI PID Index" to specify the index to the DPI PID that will carry the splice_info_sections.

Note: The "Program ID" ranges from 0 to 65535 and is a unique identification for a viewing event in the service.

Note: The "Pre-Roll Time" is the desired amount of time, in milliseconds, after being processed that the action will occur.

Note: The "Break Duration" ranges from 0 65535. If the default, 0, is chosen the Injector will not set a duration. This value is ignored if "Splice Insert Type" is anything other than "Start Normal" or "Start Immediate". The "Break Duration" is entered in tenths of seconds.

Note: The "Avail Num" is a field that gives an authentication for a specific avail in the current "Unique Program ID". The "Avail Num" ranges from 0 to 255. If left at default, 0, non-usage will be assumed.

Note: The "Avail Expect" specifies the number of individual Avails expected within the current viewing event. The "Avail Expect" ranges from 0 to 255. If left at its default, 0, "Avail Num" is assumed to have no meaning.

Pinout

1	GND
2	Logic Input #1
3	Logic Input #2
4	Logic Input #3
5	Logic Input #4
6	+Vcc
7	GND
8	Open-Collector Output #1
9	GND
10	Open-Collector Output #2
11	GND
12	Open-Collector Output #3
13	Relay Contact #1
14	Relay Contact #1
15	Relay Contact #2
16	Relay Contact #2
17	Relay Contact #3
18	Relay Contact #3

4.8 Dual Input COFDM Receiver – Option NRD00H04AA

General Information

Install Location: Any slot *except* 1-1 or 2-1.

I/O: (2) 75Ω Female F Connectors

Supported Formats: COFDM

Description: This card will allow the unit to receive a COFDM signal for use in electronic news gathering (U.S.) or any COFDM Terrestrial Broadcast (DVB-T, European) applications. Only one input may be selected at a time.

To Edit the Option Card Input Settings

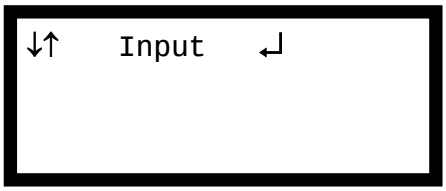
To edit this input card, use the following steps:

1. Press the INPUT button.

Note: For dual units, select RDS1 or RDS2, then press ENTER*.*

2. Use the △ and ▽ buttons to select “Input Modules”, and press the ENTER button.

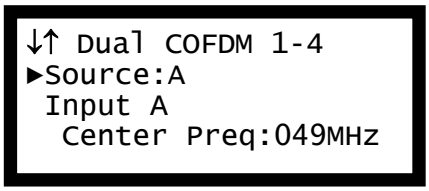
3. Use the △ and ▽ buttons to move the cursor to “Dual COFDM” card of the specific slot (e.g. 1-4). Notice the location diagram in the upper right corner of the screen changes as the cursor moves by each card.
4. Press the ENTER button once to display the Status screen for the COFDM card.
5. Press the ENTER button again to display the Edit screen for the COFDM card.



Source

This option will select which input, on the back of the card, will be active.

1. Use the △ and ▽ buttons to move the cursor to “Source:” then press the ENTER button.
2. Use the △ and ▽ buttons to select which input to be active (“A”, “B”), then press the ENTER button to save the selection.



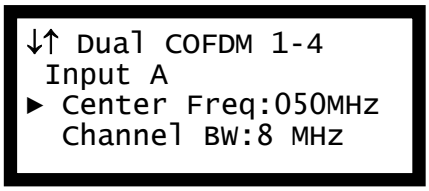
Input A

These settings correspond to the input on “Source A.”

Center Frequency A

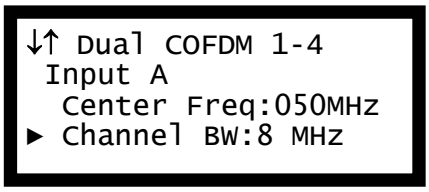
The COFDM card tunes to the center frequency of the channel to tune to.

1. Use the △ and ▽ buttons to move the cursor to “Center Freq:” then press the ENTER button.
2. Use the ◁ and ▷ buttons to select the column to edit and use the △ and ▽ buttons to change the center frequency (49 MHz – 861 MHz), then press the ENTER button to save the selection.



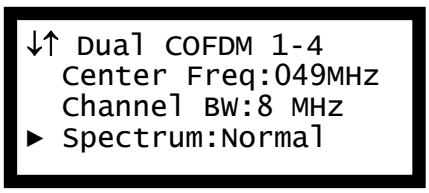
Channel Bandwidth A

1. Use the △ and ▽ buttons to move the cursor to “Channel BW:” then press the ENTER button.
2. Use the △ and ▽ buttons to change the channel bandwidth (“6 MHz”, “7 MHz”, “8 MHz”), then press the ENTER button to save the selection.



Spectrum A

1. Use the △ and ▽ buttons to move the cursor to “Spectrum:” then press the ENTER button.
2. Use the △ and ▽ buttons to change the spectrum (“Normal”, “Inverted”), then press the ENTER button to save the selection.



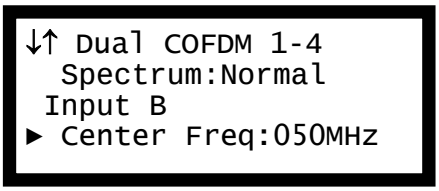
Input B

These settings correspond to the input on “Source B.”

Center Frequency B

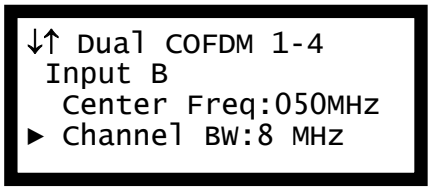
The COFDM card tunes to the center frequency of the channel to tune to.

1. Use the △ and ▽ buttons to move the cursor to “Center Freq:” then press the ENTER button.
2. Use the ◁ and ▷ buttons to select the column to edit and use the △ and ▽ buttons to change the center frequency (49 MHz – 861 MHz), then press the ENTER button to save the selection.



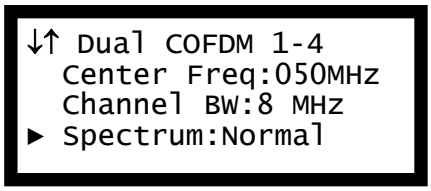
Channel Bandwidth B

1. Use the △ and ▽ buttons to move the cursor to “Channel BW:” then press the ENTER button.
2. Use the △ and ▽ buttons to change the channel bandwidth (“6 MHz”, “7 MHz”, “8 MHz”), then press the ENTER button to save the selection.



Spectrum B

1. Use the △ and ▽ buttons to move the cursor to “Spectrum:” then press the ENTER button.
2. Use the △ and ▽ buttons to change the spectrum (“Normal”, “Inverted”), then press the ENTER button to save the selection.



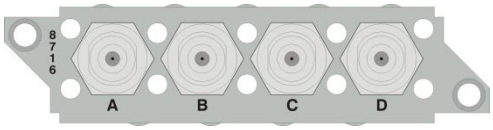
4.9 Up to 4 audio channels – Option NRD00H07AA

This option allows to decode 2 additional audio PID with the RD5000 decoder. The maximum number of decoded audio PID is then of 4 (without option the RD5000 can decode 2 audio PID). The decoded audios can be embedded in SDI signal or can be output by 2 optional audio cards (NRD00HA0AA), each optional audio card being able to process 2 audio channels.

This NRD00H07AA option is not available on RD5002 unit

4.10 Quad Input DVB-S/DVB-S2 Receiver with LNB – Option NRD00H12AB

General Information



Install Location: Any slot *except* 1-1 or 2-1.

I/O: (2) 75Ω Female F Connectors

Supported Formats: DVB-S/DVB-S2

Description: This input receives a satellite L-band (950 MHz – 2150 MHz) signal for demodulation of KU-band or C-band DVB-S QPSK signals or DVB-S2 QPSK/8PSK signals. The symbol rate ranges from 1 MSym/s to 45 MSym/s for both DVB-S and DVB-S2. This card provides LNB power and 22 kHz control tone to the active input. This card has advanced feature options of multistream input, support for VCM, and support for 16APSK and 32APSK modulation. The "Input" LED will only illuminate if the card detects frequency, symbol rate, FEC lock (Carrier Lock), and TS sync (Sync Lock). The card provides A, B, C and D inputs, which may be independently configured, but only one may be active at a time.

Warning: The NRD00H12AA (means revision A) quad DVB-S2 interface board does not support advanced features. The advanced features modes are only supported from NRD00H12AB (means revision B).

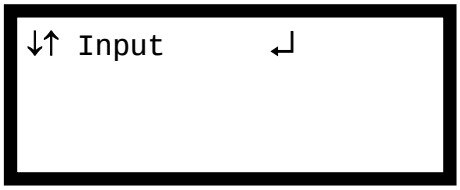
To Edit the Option Card Input Settings

To edit this input card, use the following steps:

1. Press the INPUT button.

2. Use the △ and ▽ buttons to select "Input Modules", and press the ENTER button.

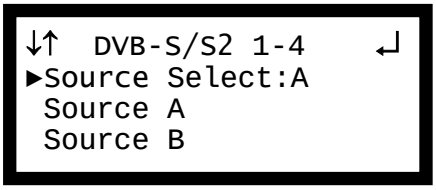
3. Use the △ and ▽ buttons to move the cursor to the "DVB-S/S2" card of the specific slot (e.g. 1-4). Notice the location diagram in the upper right corner of the screen changes as the cursor moves by each card.
4. Press the ENTER button once to display the Status screen for the DVB-S/S2 card.
5. Press the ENTER button again to display the Edit screen for the DVB-S/S2 card.



Source

This option will select which input, on the back of the card, will be active.

1. Use the △ and ▽ buttons to move the cursor to “Source Select:” then press the ENTER button.
2. Use the △ and ▽ buttons to select which input to be active (“A”, “B”, “C”, “D”), then press the ENTER button to save the selection.



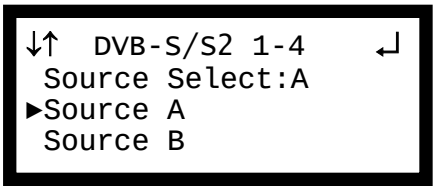
Source Settings

These settings correspond to the “Source” input that is selected. Repeat these steps for each input source, “Source A”, “Source B”, “Source C” and “Source D”.

Selecting the Source

The DVB-S/S2 card can receive either DVB-S or DVB-S2 transmission.

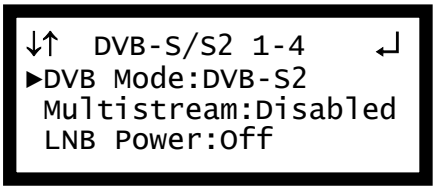
1. Use the △ and ▽ buttons to move the cursor to the Source (“Source A” , “Source B”, “Source C”, “Source D”) to edit the settings, then press the ENTER button.



DVB Mode

The DVB-S/S2 card can receive either DVB-S or DVB-S2 transmission.

1. Use the △ and ▽ buttons to move the cursor to “DVB Mode:” then press the ENTER button.
2. Use the △ and ▽ buttons to select either (“DVB-S”, “DVB-S2”), then press the ENTER button to save the selection.



Enabling Advanced DVB-S2 Capabilities

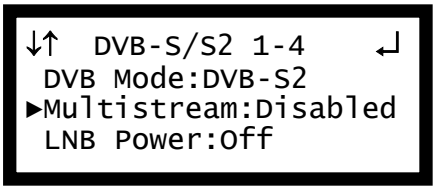
The NRD00H12AB option card can support Multistream input, VCM, 16APSK and 32APSK Modulation. These advanced capabilities are enabled with an “Advanced Satellite Features” license, see Section 4.26 and 5.13. The license is enabled by entering a License Key and the status of the License is noted in the License “Feature List”. The license enables the “Advanced Satellite Features” capabilities for all NRD00H12AB option cards in the unit.

When licensed, the “Multistream” settings will be available and the NRD00H12AB option card will be able to receive multistream transport streams, VCM, 16APSK modulation and 32APSK modulation.

Multistream Mode

When “Multistream” is disabled (or not licensed), the card will not be able to receive multistream inputs. The card will identify the input error as a multistream input.

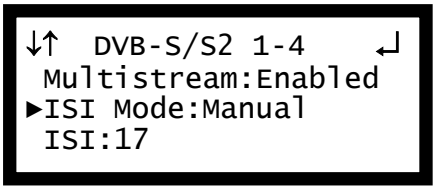
1. Use the △ and ▽ buttons to move the cursor to “Multistream:” then press the ENTER button.
2. Use the △ and ▽ buttons to select either (“Off”, “On”), then press the ENTER button to save the selection.



ISI

Note: The setting of the “ISI” is only available when the “Multistream Mode” is set to “On”.

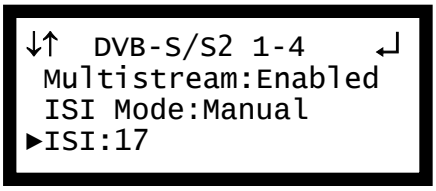
1. Use the △ and ▽ buttons to move the cursor to “ISI Mode:” then press the ENTER button.
2. Use the △ and ▽ buttons to select either (“Manual”, “List”), then press the ENTER button to save the selection.



Available ISI

The selection of ISI values are from the ones available within the multistream input.

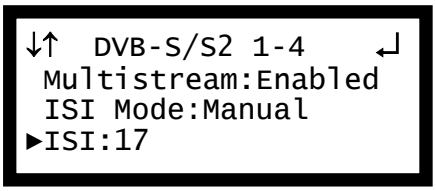
1. Use the △ and ▽ buttons to select an ISI that is available in the multistream input, then press the ENTER button to save the selection.



Manual ISI

The ISI value is entered independent of the ISI values present in the input multistream. This is used when the Source is being configured without the source being the active input.

1. Use the ◁ and ▷ buttons to select the column to edit and use the △ and ▽ buttons to change the ISI value (0 – 255), then press the ENTER button to save the selection.

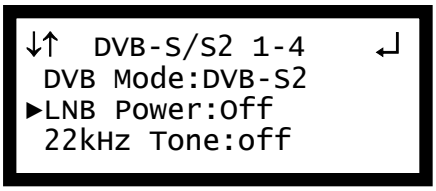


LNB Power

LNB power is configurable separately for each Source input, but is only supplied to the active source.

In addition, the power is used to transmit the polarization to the LNB.

1. Use the △ and ▽ buttons to move the cursor to “LNB Power:” then press the ENTER button.
2. Use the △ and ▽ buttons to select “Off”, “13VDC” or “14VDC” for vertical polarization, “18VDC”or “19VDC” for horizontal polarization, then press the ENTER button to save the selection.

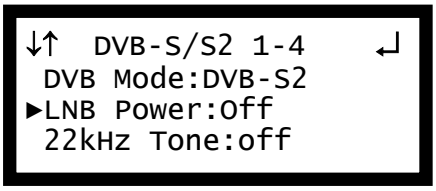


22 kHz Tone

22 kHz Tone is configurable separately for each Source input, but is only supplied to the active source. The 22 kHz Control Tone setting is either on or off.

Note: The 22 kHz Tone is only sent if the is LNB Power being supplied – the LNB Power is not set to “off”.

1. Use the △ and ▽ buttons to select “Off”, “13VDC”, “14VDC”, “18VDC”, “19VDC”, then press the ENTER button to save the selection.
2. Use the △ and ▽ buttons to move the cursor to “22 kHz Tone:” then press the ENTER button.



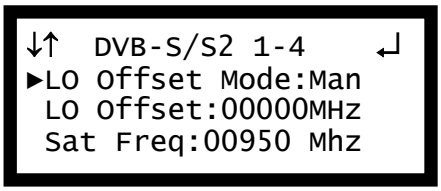
Tuning Frequency

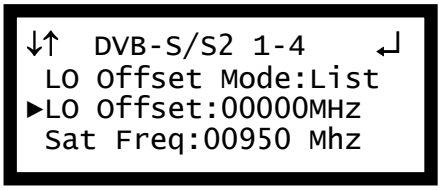
The DVB-S/S2 card tunes by the L-band frequency rather than the transponder frequency or local oscillator value. The L-band frequency is the difference between the downlink transponder frequency “Sat Freq:” and the LNB local oscillator frequency “LO Offset:”. The IRD will calculate the actual frequency in which the card tunes; saving the user time and possible miscalculation errors.

Local Oscillator Offset

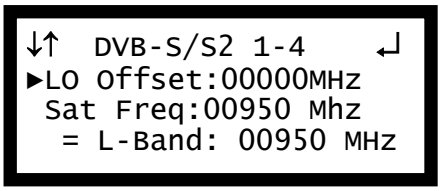
The Local Oscillator Offset provides preset values that can be selected using the List mode. Any valid Local Oscillator Offset value can be entered using the Manual mode.

1. Use the △ and ▽ buttons to move the cursor to “LO Offset Mode:” then press the ENTER button.
2. Use the △ and ▽ buttons to select “Man” (for manual) or “List”, then press the ENTER button to save the selection.
3. When in “List” mode, use the △ and ▽ buttons to move the cursor to “LO Offset:”, then press the ENTER button.
4. Use the △ and ▽ buttons to select “00000MHz”, 05150MHz”, 09750MHz”, “10600MHz”, “10750MHz” or “11250MHz” as the “LO Offset” setting, then press the ENTER button to save the setting.





5. When in “Man” mode, use the △ and ▽ buttons to move the cursor to “LO Offset:” then press the ENTER button.
6. Use the ◁ and ▷ buttons to select the column to edit and use the △ and ▽ buttons to change the Local Oscillator Offset (0 – 13550 MHz), then press the ENTER button to save the selection.

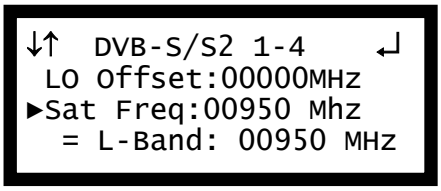


Note: If a value is entered results in a calculated L-Band that is out of range, an “Out of Range!” message will be shown.

Note: The L-Band calculation is shown after the “Sat Freq:” line. The valid L-Band frequency range is 950 – 2150 MHz.

Satellite Frequency

1. Use the △ and ▽ buttons to move the cursor to “Sat Freq:” then press the ENTER button.
2. Use the ◁ and ▷ buttons to select the column to edit and use the △ and ▽ buttons to change the frequency (950 MHz – 14500 MHz), then press the ENTER button to save the selection.

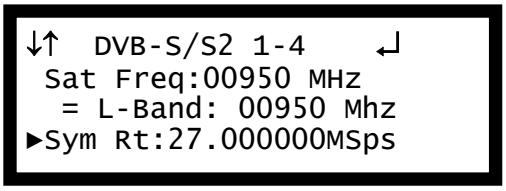


Note: If a value is entered results in a calculated L-Band that is out of range, an “Out of Range!” message will be shown.

Note: The L-Band calculation is shown after the “Sat Freq:” line. The valid L-Band frequency range is 950 – 2150 MHz.

Symbol Rate

1. Use the △ and ▽ buttons to move the cursor to “Sym Rt:” then press the ENTER button.
2. Use the ◁ and ▷ buttons to select the column to edit and use the △ and ▽ buttons to change the symbol rate (1 MSps – 45 MSps).
3. Then press the ENTER button to save the selection.



4.11 CA Decryption – Basic feature

General Information

Install Location: Factory Installed

I/O: Two external slots in the front of the unit. The transport stream is input and output through the various other option cards

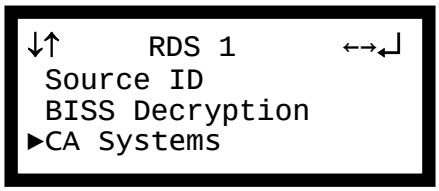
Description: The unit can decrypt a Conditional Access transport stream. In Config 1 the dual CAM functionality can be used to decrypt multiple services to send out ASI, essentially looping the stream through the unit for decryption.

This feature also provides BISS decryption.

CAM Decryption Setup

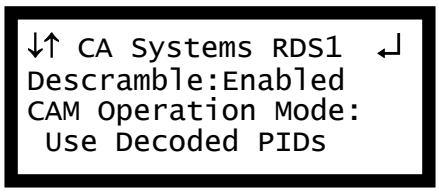
To setup the unit to decrypt Conditional Access Streams use the following steps.

1. Press the HOME button to bring the display back to the RDS status screen.
2. Press the ◁ button to access the RDS 1 Decoder Menu.



Note: For dual units, all of the following instructions apply exactly the same except, use the ▷ button to access the RDS 2 Menu.

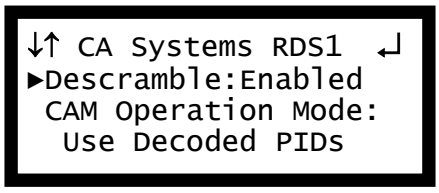
3. Use the △ and ▽ buttons to move the cursor to "CA Systems", then press the ENTER button to display the CAM status.
4. Press the ENTER button again to edit the CAM settings.



RDS CAM Usage Setting

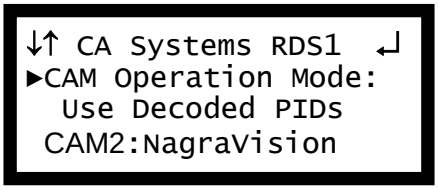
The PIDs are sent to the CA System whenever it is enabled. When disabled, the PIDs are not sent to the CA System for decryption.

1. Use the △ and ▽ buttons to move the cursor to "Descramble", then press the ENTER button.
2. Use the △ and ▽ buttons to change the setting ("Enabled" or "Disabled"), then press the ENTER button to save the selection.



Setting the CAM Operation Mode

1. Use the △ and ▽ buttons to move the cursor to “CAM Operation Mode”, then press the ENTER button.
2. Use the △ and ▽ buttons to change the mode (“Use Decoded PIDs” or “Use Selected PIDs”), then press the ENTER button to save the selection.



Note: Depending on the mode selection, the menus below the mode options will have changed.

Use Decoded PIDs

In the “Use Decoded PIDs” operation mode, the CAM will decrypt the audio and video programs that are decoded by the unit. The Service Selection tuning determines the program that is sent to the CAM for decrypting before the decoding takes place. Only the program used for decoding is sent to the CAM no matter how many programs the CAM is capable of decrypting. If programs other than (or in addition to) the one being decoded is to be sent to the CAM for decryption, the “Use Selected PIDs” mode should be used.

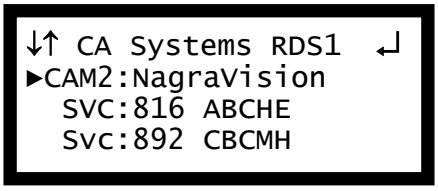
Use Selected PIDs

The “Use Selected PIDs” operation mode allows the selection of individual video and audio PIDs to send to the CAM for decryption. There is no restriction on which PIDs can be selected (audio and video PIDs need not be in the same program). The PIDs are selected from the PIDs that are available in the PMT of the input. If there is no input PMT available, the selection of PIDs will not be possible. If a selected PID is no longer listed in the input PMT, the Service that contained the PID will be listed followed by a “*” indication. The Services with PIDs that are no longer in the PMT can be found on the bottom of the Service list.

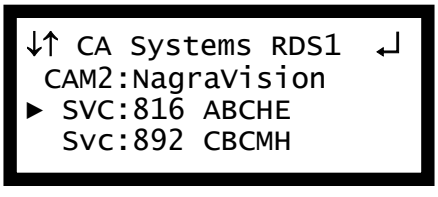
Once “CAM Operation Mode” has been set to “Use Selected PIDs”, use the following steps to configure your unit to decrypt selected PIDs.

Note: It is only possible to decrypt more than one program at a time, if the CAM module supports multiple program decrypting.

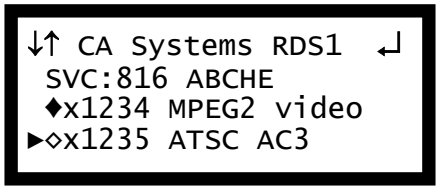
1. The Services that are sent to the CAMs are listed under the “CAM1” or “CAM2” (with the CAM name if available).



2. Use the △ and ▽ buttons to move the cursor to the program (Service) which contains the PIDs to be selected, then press the ENTER button.
3. The video and audio PIDs that are available for that Service in the PMT are listed.



4. Use the △ and ▽ buttons to move the cursor to the PID to be selected or deselected, then press the ENTER button.
5. Press the ENTER button to edit the selection.
6. Use the △ and ▽ buttons to change the selection status.
7. Press the ENTER button to save the selection.



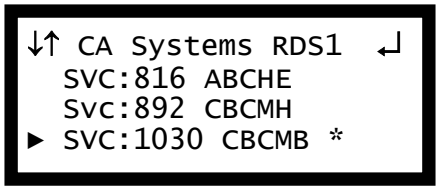
Note: The short name is listed (if available) with the Service. The PIDs video type and audio language information is shown along with the PID.

Note: The symbol "♦" denotes that the PID is a selected PID (being sent to the CAM). The symbol "◊" denotes that the PID is not selected (not being sent to the CAM).

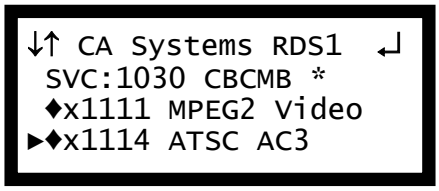
PIDs No Longer in the Input PMT

The selected PIDs that are no listed in the PMT are listed followed with a "*" under the associated CAM. The list contains the Services, with PID selection available after selecting the Service. These PIDs can be selected or deselected. It they remain selected and appear in the PMT, those PIDs will be sent to the CAM for decryption.

1. Use the ◁ and ▷ buttons to move the cursor to a "*"'ed Service, then press the ENTER button.



2. Use the △ and ▽ buttons to move the cursor to the PID to be selected or deselected, then press the ENTER button.



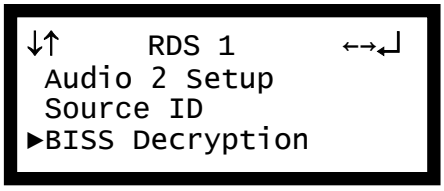
3. Use the △ and ▽ buttons to change the selection status.
4. Press the ENTER button to save the selection.
5. The display will return to the PID selection list (Step 3) with the correct "♦" or "◊".

Note: When the Service no longer has PIDs that are not in the PMT, it will not be listed as a ""'ed Service.*

BISS Setup

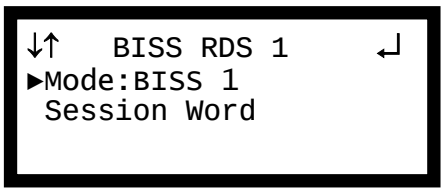
To setup the unit to be able to decrypt a BISS encrypted transport stream use the following steps:

1. Press the HOME button to bring the display back to the RDS status screen.
2. Press the ◁ button to access the RDS 1 Decoder Menu.
3. Use the △ and ▽ buttons to move the cursor to “BISS Decryption,” then press the ENTER button.
4. Press the ENTER button again to edit the Source ID settings.



Note: To configure dual units, all of the following instructions apply exactly the same except, use the ▷ button to access the RDS 2 Menu.

5. Use the △ and ▽ buttons to move the cursor to “Mode:” then press the ENTER button.
6. Use the △ and ▽ buttons to change the mode (“BISS 1” or “BISS E”) then press the ENTER button to save the selection.

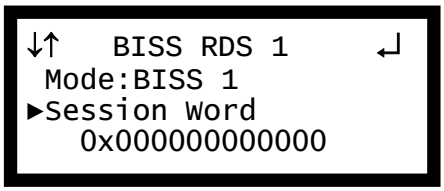


Note: Depending on the mode selection, the menus below the mode options will have changed.

Mode BISS 1

Once the unit has been set to use Mode 1, use the following steps to enter the “Session Word:”

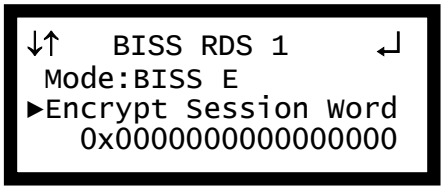
1. Use the △ and ▽ buttons to move the cursor to “Session Word” then press the ENTER button.
2. Use the ◁ and ▷ buttons to select the column to edit and use the △ and ▽ buttons to enter the session word, then press the ENTER button to save the selection.



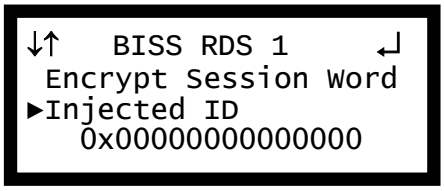
Mode BISS E

Once the unit has been set to use Mode E, use the following steps to enter the “Encrypted Session Word” and “Injected ID:”

1. Use the △ and ▽ buttons to move the cursor to “Encrypt Session Word” then press the ENTER button.
2. Use the ◁ and ▷ buttons to select the column to edit and use the △ and ▽ buttons to enter the encrypted session word, then press the ENTER button to save the selection.

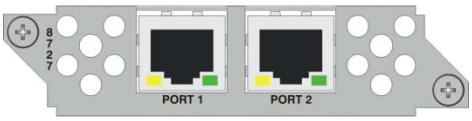


3. Use the △ and ▽ buttons to move the cursor to “Injected ID” then press the ENTER button.
4. Use the ◁ and ▷ buttons to select the column to edit and use the △ and ▽ buttons to enter the injected ID, then press the ENTER button to save the selection.



4.12 Dual MPEG over IP Input/ UDP Output – Option NRD00H05AA

General Information



Install Location: Installs in 1–2 through 1–4 and/or 2–2 through 2–4.

I/O: (2) 10/100/1000 Auto-negotiating Base-T RJ-45 Ethernet Port

Supported Formats: Receive UDP or RTP Multicasts and Unicasts. Transmit: UDP only

Description: This card encapsulates the TS from the bus and will transmit IP streams. It can also take in IP streams and place them on the bus for an ASI/310M card and/or a decoder. Up to two multicasts can be subscribed to, allowing for a backup multicast to be chosen and two mirrored unicasts can be transmitted to allow for redundancy. The two physical connectors can be configured independently.

Menu Control

This menu is used to setup the IP address, Subnet Mask, and Gateway for the MPEG/IP card. These settings need to be set to proper values for the network that the unit is being used on. These values can usually be obtained from the local network administrator.

1. Press the MENU button.
2. Use the △ and ▽ buttons to move the cursor to "MPEG/IP NetCfg", then press the ENTER button.

```
↓↑       Menu          ↵
▶MPEG/IP NetCfg
 Genlock Reference
 System
```

3. Select "Port 1" or "Port 2" and then press the ENTER button.

```
↓↑ MPEG/IP NetCfg    ↵
    Select a Port
▶Port 1
 Port 2
```

IP Address/Subnet Mask/Gateway

1. Use the △ and ▽ buttons to move the cursor to "IP Address", then press the ENTER button.
2. Use the ◁ and ▷ buttons to select the column to edit and use the △ and ▽ buttons to change the IP, then press the ENTER button to save the selection.
3. The cursor will now be on, "Subnet Mask".
4. Use the ◁ and ▷ buttons to select the column to edit and use the △ and ▽ buttons to change the Subnet Mask, then press the ENTER button to save the selection.

```
↓↑ MPEG/IP 1-4 Net←→↵
 IP Address
▶ 010.000.000.051
 Subnet Mask
```

```
↓↑ MPEG/IP 1-4 Net←→↵
  10.0.0.51
 Subnet Mask
▶ 255.000.000.000
```

5. The cursor will now be on, “Gateway.”
6. Use the ◁ and ▷ buttons to select the column to edit and use the △ and ▽ buttons to change the Gateway, then press the ENTER button to save the selection.

MAC Address

This option will show the physical MAC Address of the MPEG/IP card.

1. Use the △ and ▽ buttons to move the cursor to “MAC Address” to view the MPEG/IP card’s physical MAC Address.

To Edit the Option Card Input Settings

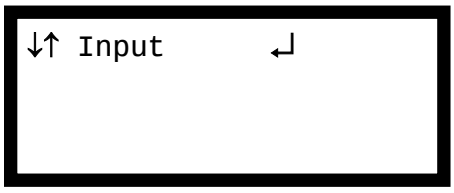
To edit this input card, use the following steps:

1. Press the INPUT button.

Note: For dual units, select RDS1 or RDS2, then press ENTER.

2. Use the △ and ▽ buttons to select “Input Modules”, and press the ENTER button.

3. Use the △ and ▽ buttons to move the cursor to the “MPEG/IP” card of the specific slot (e.g. 1-4). Notice the location diagram in the upper right corner of the screen changes as the cursor moves by each card.
4. Press the ENTER button once to display the Status screen for the MPEG/IP card.
5. Press the ENTER button again to display the Edit screen for the MPEG/IP card.



Group Selection Settings

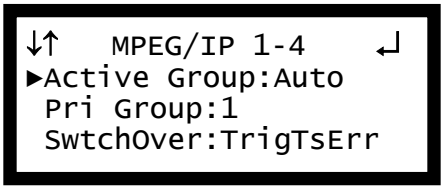
This section allows the user to specify which Receive Group is active (Receive 1 or Receive 2), if one of the receive groups acts as a backup for the other receive group (setting the “Active Group:” to “Auto”) and then setting the backup options.

The backup options assign a primary receive group, what is used to trigger the switchover to the backup receive group, when the Primary should be restored and the timeout before switching to the Backup or restoring to the Primary.

The unit is usually configured to have either the MPEG/IP backup enabled or the Input Option backup enabled, not both.

Selecting the Active Receive Group

1. Use the △ and ▽ buttons to move the cursor to “Active Group:” then press the ENTER button.
2. Use the △ and ▽ buttons to select “1”, “2” or “Auto”, then press the ENTER button to save the selection.



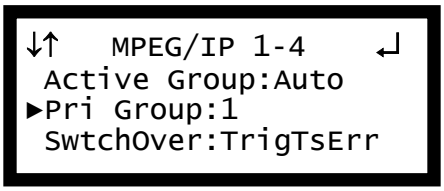
Note: Using “Auto” will enable the backup functionality.

Note: When the backup functionality is being used, the user can choose which Receive Group is being used as follows: setting the “Pri Group:” to the desired group or by setting the “Active Group:” to the desired group, and then activating the backup functionality again by setting the “Active Group:” to “Auto”.

Setting the Primary Receive Group

Note: The Receive Group that is not selected as the Primary Receive Group will be the Backup Receive Group.

1. Use the △ and ▽ buttons to move the cursor to “Pri Group:” then press the ENTER button.
2. Use the △ and ▽ buttons to select “1” or “2”, then press the ENTER button to save the selection.

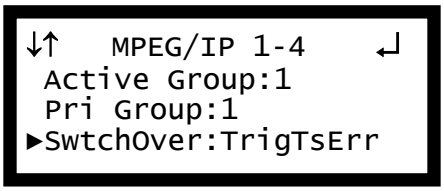


Setting the Switchover Trigger

This sets the failure that is used to initiate a switchover to the backup. It is either a failure of the Receive Group reception (“TrigTSErr”) that is detected by a lack of TS Presence in the Receive Group, or when the video cannot be decoded (“TrigDecErr”).

When “TrigDecErr” is used, the “Pri Rest” (Primary Restore) will be set to “Never” and the “Pri Rest:” option is not presented. This is done because the Primary restore uses the TS Presence (“TrigTSErr”) to detect when the primary is present, and unstable operation could take place if the switchover triggers are not consistent.

1. Use the △ and ▽ buttons to move the cursor to "SwtchOver:" then press the ENTER button.
2. Use the △ and ▽ buttons to select "TrigTsErr" or "TrigDecErr", then press the ENTER button to save the selection.



Note: Using "TrigDecErr" sets "Pri Rest" to "Never" and does not is to be changed.

Setting when to Restore to the Primary

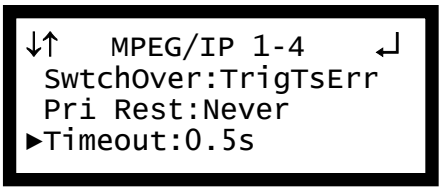
Note: This is not changeable when using "TrigDecErr" ("Pri Rest" is set to "Never" is this case).

1. Use the △ and ▽ buttons to move the cursor to "Pri Rest:" then press the ENTER button.
2. Use the △ and ▽ buttons to select "Never", "WhnPriRet" (When the Primary Returns), or "OnBkpFail" (On Backup Failure), then press the ENTER button to save the selection.

Setting the Switchover Timeout

The Switchover Timeout is the delay between the detection of the failure and the switch to either the backup or back to the primary (controlled by the Restore to Primary setting) receive group.

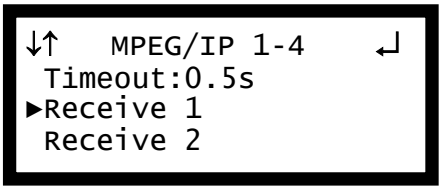
1. Use the △ and ▽ buttons to move the cursor to "Timeout:" then press the ENTER button.
2. Use the △ and ▽ buttons to select the time in seconds (from 0 to 10 seconds in 0.5 second intervals), then press the ENTER button to save the selection.



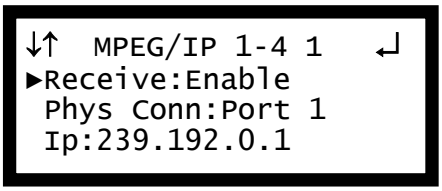
Receive 1

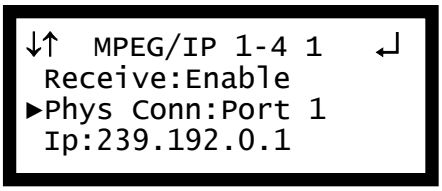
This section allows the user to setup the receive function of the first receive group.

1. Use the △ and ▽ buttons to move the cursor to "Receive 1" then press the ENTER button.



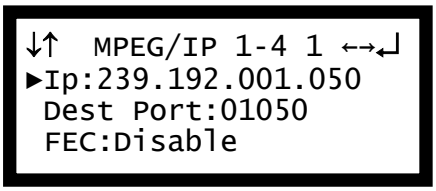
2. Use the △ and ▽ buttons to move the cursor to “Receive:” then press the ENTER button.
3. Use the △ and ▽ buttons to “Enable” or “Disable” Receive 1, then press the ENTER button to save the selection.
4. Use the △ and ▽ buttons to move the cursor to “Phys Conn:” then press the ENTER button.
5. Choose the physical connector using the △ and ▽ buttons (“Port 1” or “Port 2”) then press the ENTER button.





IP

1. Use the △ and ▽ buttons to move the cursor to “IP:” then press the ENTER button.
2. Use the ◁ and ▷ buttons to select the column to edit and use the △ and ▽ buttons to change the IP, then press the ENTER button to save the selection.

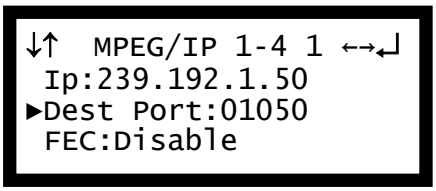


Notes:- A Unicast or Multicast IP address may be chosen.
Unicast: X.X.X.X – 223.255.255.255
Multicast: 224.0.0.0 – 239.255.255.255
Suggested Multicast Range: 239.192.X.X.

- In case of unicast reception, the unit takes into account only the port number and not the source IP address.

Destination Port

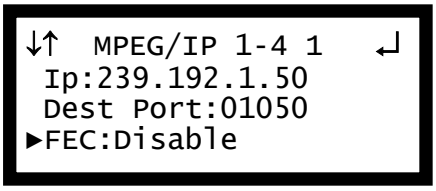
1. Use the △ and ▽ buttons to move the cursor to “Dest Port:” then press the ENTER button.
2. Use the ◁ and ▷ buttons to select the column to edit and use the △ and ▽ buttons to change the port (0 – 65536), then press the ENTER button to save the selection.



Forward Error Correction

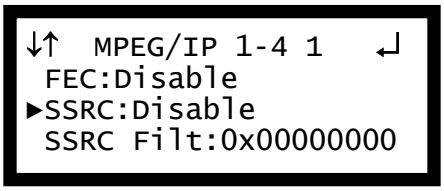
This setting lets the decoder know if it should be expecting FEC data with the active receive group. If no FEC data is expected, this setting can be disabled to allow multicasts closer together on the same IP.

1. Use the △ and ▽ buttons to move the cursor to "FEC:" then press the ENTER button.
2. Use the △ and ▽ buttons to select "enable" or "disable", then press the ENTER button to save the selection.



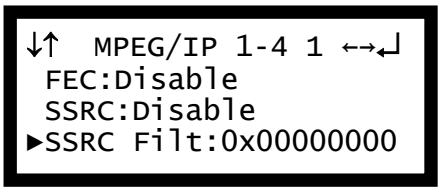
Synchronized Source Setup

1. Use the △ and ▽ buttons to move the cursor to "SSRC:" then press the ENTER button.
2. Use the △ and ▽ buttons to select "Enable" or "Disable", then press the ENTER button to save the selection.



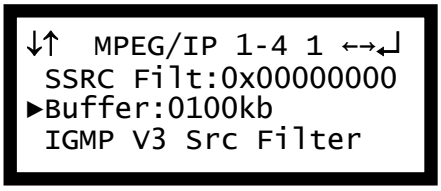
Synchronized Source Setup Filter

1. Use the △ and ▽ buttons to move the cursor to "SSRC Filt:" then press the ENTER button.
2. Use the ◁ and ▷ buttons to select the column to edit and use the △ and ▽ buttons to change the SSRC Filter, then press the ENTER button to save the selection.



Buffer

1. Use the △ and ▽ buttons to move the cursor to "Buffer:" then press the ENTER button.
2. Use the ◁ and ▷ buttons to select the column to edit and use the △ and ▽ buttons to change the Buffer (from 3999 kb to 100 kb), then press the ENTER button to save the selection.

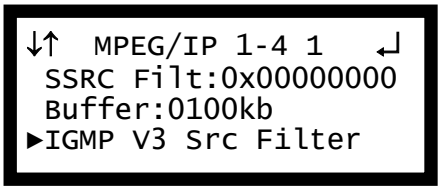


IGMP V3 Source Filter

Note: Any emitter can send IP packets to a multicast address, so it could happen that by mistake two emitters send to the same multicast address. The resultant multicast stream would be completely garbled. IGMP V3 gives the user the possibility to indicate a source address, so that by indicating "IGMP V3 include <IP multicast source address> the unit will take only the IP packets coming from the indicated source address, thus eliminating the garbling problem.

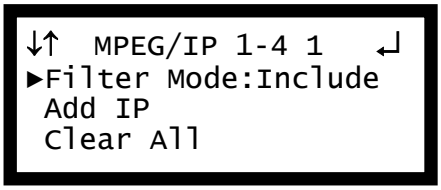
Alternately, if the offending source address is known, the user can indicate "IGMP V3 exclude <IP multicast source address of the scrambler>, and the unit will not take into account IP packets coming from the indicated address.
To not use the IGMP V3 filter, simply select "IGMP V3 exclude" and do not indicate any IP address to exclude.
Beware if you select "IGMP V3 include" and you do not indicate the multicast source address the unit will receive nothing.

1. Use the △ and ▽ buttons to move the cursor to "IGMP V3 Src Filter", then press the ENTER button to access the Edit screen.



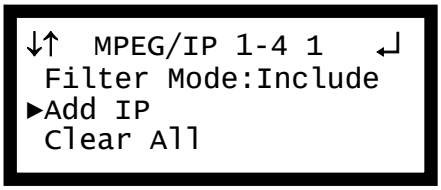
Filter Mode

1. Use the △ and ▽ buttons to move the cursor to "Filter Mode:" then press the ENTER button.
2. Use the △ and ▽ buttons to select either "Include" or "Exclude", then press the ENTER button to save the selection.



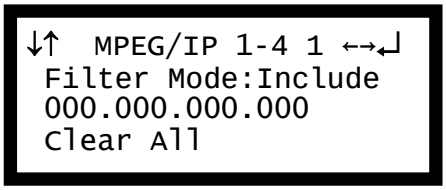
Add IP

1. Use the △ and ▽ buttons to move the cursor to "Add IP", then press the ENTER button.
2. Press the ENTER button again to add an IP address to the list.



Note: Existing IP addresses are shown before the "Add IP" option.

3. Use the ◁ and ▷ buttons to select the column to edit and use the △ and ▽ buttons to change the IP address, then press the ENTER button to save the selection.

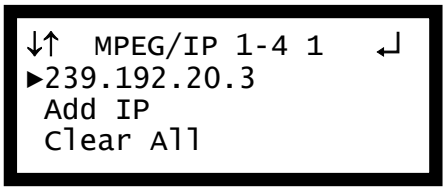


Note: A maximum of 64 IP addresses may be added to the list.

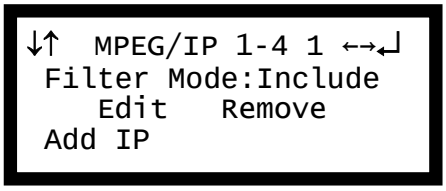
Edit/Remove an IP

Note: Existing IP addresses are shown before the "Add IP" option.

1. Use the △ and ▽ buttons to move the cursor to the desired IP address to edit, then press the ENTER button.



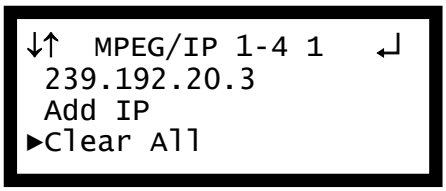
2. Use the ◁ and ▷ buttons to select either "Edit" or "Remove", then press the ENTER button.



Clear All

This option will clear all IP addresses in the filter list.

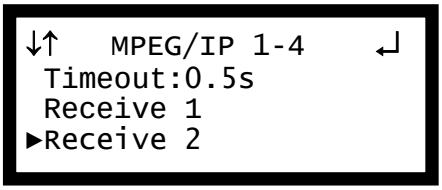
1. Use the △ and ▽ buttons to move the cursor to "Clear All", then press the ENTER button.
2. Press the ENTER button one more time to clear all the IP addresses in the list.



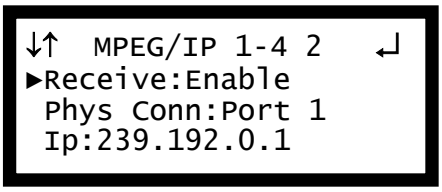
Receive 2

This section allows the user to setup the receive function of the second receive group.

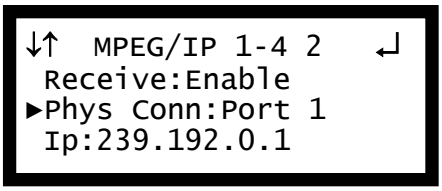
1. Use the △ and ▽ buttons to move the cursor to "Receive 1" then press the ENTER button.



2. Use the △ and ▽ buttons to move the cursor to "Receive:" then press the ENTER button.
3. Use the △ and ▽ buttons to "Enable" or "Disable" Receive 1, then press the ENTER button to save the selection.

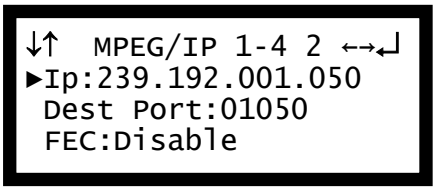


4. Use the △ and ▽ buttons to move the cursor to "Phys Conn:" then press the ENTER button.
5. Choose the physical connector using the △ and ▽ buttons ("Port 1" or "Port 2") then press the ENTER button.



IP

1. Use the △ and ▽ buttons to move the cursor to “IP:” then press the ENTER button.
2. Use the ◁ and ▷ buttons to select the column to edit and use the △ and ▽ buttons to change the IP, then press the ENTER button to save the selection.

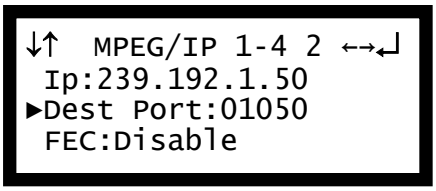


Notes:- A Unicast or Multicast IP address may be chosen.
Unicast: X.X.X.X – 223.255.255.255
Multicast: 224.0.0.0 – 239.255.255.255
Suggested Multicast Range: 239.192.X.X.

- In case of unicast reception, the unit takes into account only the port number and not the source IP address.

Destination Port

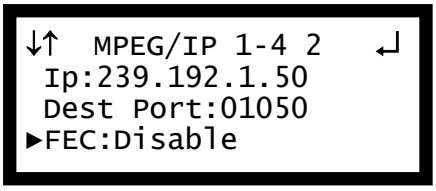
1. Use the △ and ▽ buttons to move the cursor to “Dest Port:” then press the ENTER button.
2. Use the ◁ and ▷ buttons to select the column to edit and use the △ and ▽ buttons to change the port (0 – 65536), then press the ENTER button to save the selection.



Forward Error Correction

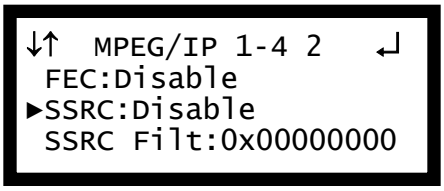
This setting lets the decoder know if it should be expecting FEC data with the active receive group. If no FEC data is expected, this setting can be disabled to allow multicasts closer together on the same IP.

1. Use the △ and ▽ buttons to move the cursor to “FEC:” then press the ENTER button.
2. Use the △ and ▽ buttons to select “enable” or “disable”, then press the ENTER button to save the selection.



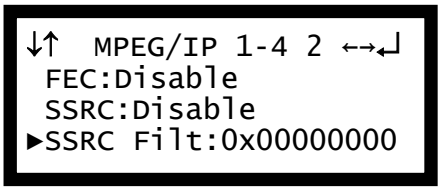
Synchronized Source Setup

1. Use the △ and ▽ buttons to move the cursor to “SSRC:” then press the ENTER button.
2. Use the △ and ▽ buttons to select “Enable” or “Disable”, then press the ENTER button to save the selection.



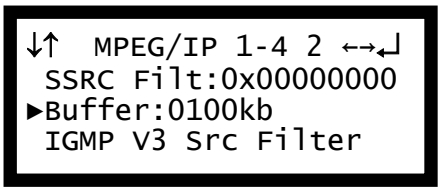
Synchronized Source Setup Filter

1. Use the △ and ▽ buttons to move the cursor to “SSRC Filt:” then press the ENTER button.
2. Use the ◁ and ▷ buttons to select the column to edit and use the △ and ▽ buttons to change the SSRC Filter, then press the ENTER button to save the selection.



Buffer

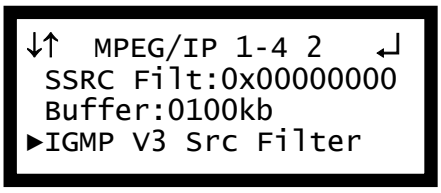
1. Use the △ and ▽ buttons to move the cursor to “Buffer:” then press the ENTER button.
2. Use the ◁ and ▷ buttons to select the column to edit and use the △ and ▽ buttons to change the Buffer (from 3999 kb to 100 kb), then press the ENTER button to save the selection.



IGMP V3 Source Filter

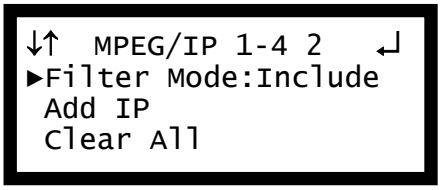
Note: Any emitter can send IP packets to a multicast address, so it could happen that by mistake two emitters send to the same multicast address. The resultant multicast stream would be completely garbled. IGMP V3 gives the user the possibility to indicate a source address, so that by indicating "IGMP V3 include <IP multicast source address> the unit will take only the IP packets coming from the indicated source address, thus eliminating the garbling problem. Alternately, if the offending source address is known, the user can indicate "IGMP V3 exclude <IP multicast source address of the scrambler>, and the unit will not take into account IP packets coming from the indicated address.
To not use the IGMP V3 filter, simply select "IGMP V3 exclude" and do not indicate any IP address to exclude.
Beware if you select "IGMP V3 include" and you do not indicate the multicast source address the unit will receive nothing.

1. Use the △ and ▽ buttons to move the cursor to “IGMP V3 Src Filter”, then press the ENTER button to access the Edit screen.



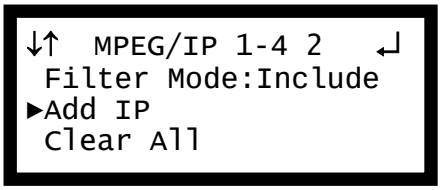
Filter Mode

1. Use the △ and ▽ buttons to move the cursor to “Filter Mode:” then press the ENTER button.
2. Use the △ and ▽ buttons to select either “Include” or “Exclude”, then press the ENTER button to save the selection.



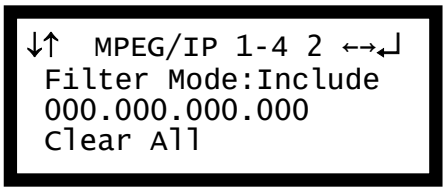
Add IP

1. Use the △ and ▽ buttons to move the cursor to “Add IP”, then press the ENTER button.
2. Press the ENTER button again to add an IP address to the list.



Note: Existing IP addresses are shown before the “Add IP” option.

3. Use the ◁ and ▷ buttons to select the column to edit and use the △ and ▽ buttons to change the IP address, then press the ENTER button to save the selection.

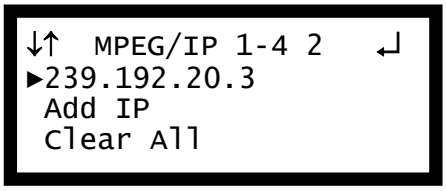


Note: A maximum of 64 IP addresses may be added to the list.

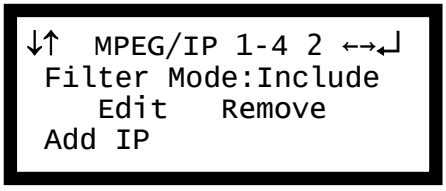
Edit/Remove an IP

Note: Existing IP addresses are shown before the “Add IP” option.

1. Use the △ and ▽ buttons to move the cursor to the desired IP address to edit, then press the ENTER button.



2. Use the ◁ and ▷ buttons to select either “Edit” or “Remove”, then press the ENTER button.



Clear All

This option will clear all IP addresses in the filter list.

1. Use the △ and ▽ buttons to move the cursor to "Clear All", then press the ENTER button.
2. Press the ENTER button one more time to clear all the IP addresses in the list.

Reset Counters

This option will reset the counters on the status screen for the MPEG/IP card.

1. Use the △ and ▽ buttons to move the cursor to "Reset Counters", then press the ENTER button.
2. Press the ENTER button again to reset the counters.

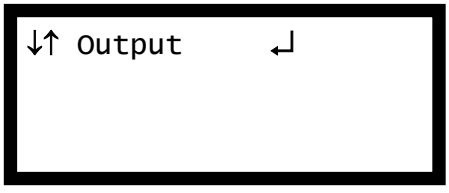
Output Control

To configure this card as an output use the following steps:

1. Press the OUTPUT button.

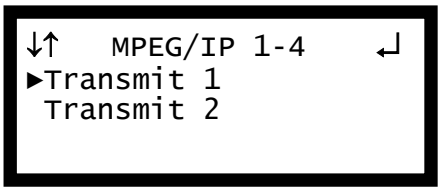
Note: For dual units, select RDS1 or RDS2, then press ENTER.

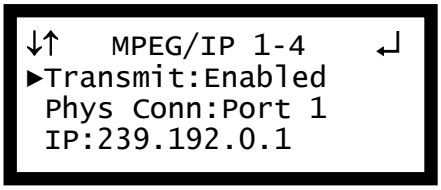
2. Use the △ and ▽ buttons to move the cursor to the "MPEG/IP" card of the specific slot (e.g. 1-4). Notice the location diagram in the upper right corner of the screen changes as the cursor moves by each card.
3. Press the ENTER button once to display the selection screen for "Transmit 1" and "Transmit 2" of the MPEG/IP card.

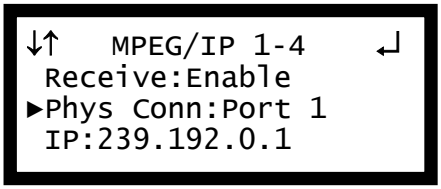


Transmit 1

1. Use the △ and ▽ buttons to move the cursor to “Transmit 1”, then press the ENTER button. The status will be displayed.
2. Press the ENTER button one more time to get to the Edit screen.
3. Use the △ and ▽ buttons to move the cursor to “Transmit:” then press the ENTER button.
4. Use the △ and ▽ buttons to set the Transmit 1 to “Enabled” or “Disabled”, then press the ENTER button to save the selection.
5. Use the △ and ▽ buttons to move the cursor to “Phys Conn:” then press the ENTER button.
6. Choose the physical connector using the △ and ▽ buttons (“Port 1” or “Port 2”) then press the ENTER button.

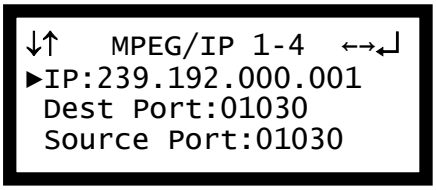






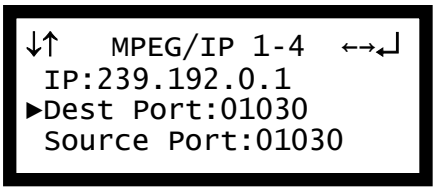
IP

1. Use the △ and ▽ buttons to move the cursor to “IP:” then press the ENTER button.
2. Use the ◁ and ▷ buttons to select the column to edit and use the △ and ▽ buttons to change the IP, then press the ENTER button to save the selection.



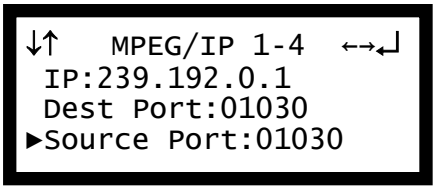
Destination Port

1. Use the △ and ▽ buttons to move the cursor to “Dest Port:” then press the ENTER button.
2. Use the ◁ and ▷ buttons to select the column to edit and use the △ and ▽ buttons to change the destination port (1025 – 65536), then press the ENTER button to save the selection.



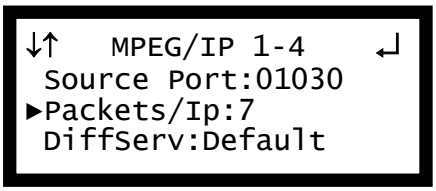
Source Port

1. Use the △ and ▽ buttons to move the cursor to “Source Port:” then press the ENTER button.
2. Use the ◁ and ▷ buttons to select the column to edit and use the △ and ▽ buttons to change the destination port (1025 – 65536), then press the ENTER button to save the selection.



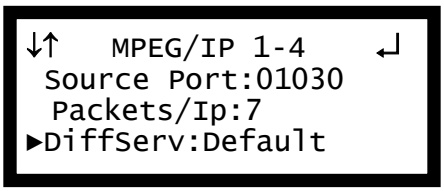
Packets Per Frame

1. Use the △ and ▽ buttons to move the cursor to “Packets/Ip:” then press the ENTER button.
2. Use the ◁ and ▷ buttons to select the column to edit and use the △ and ▽ buttons to change the number of packets per frame (1 –7), then press the ENTER button to save the selection.



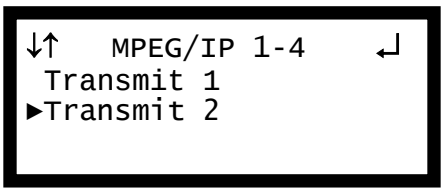
Differentiated Services

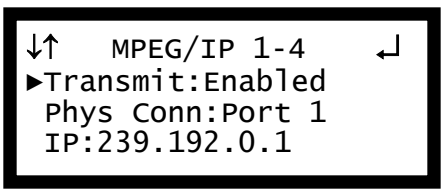
1. Use the △ and ▽ buttons to move the cursor to “DiffServ:” then press the ENTER button.
2. Use the ◁ and ▷ buttons to select the column to edit and use the △ and ▽ buttons to change between (“Default”, “AF11”, “AF12”, “AF13”, “AF21”, “AF22”, “AF23”, “AF31”, “AF32”, “AF33”, “AF41”, “AF42”, “AF43”, “EF”), then press the ENTER button to save the selection.



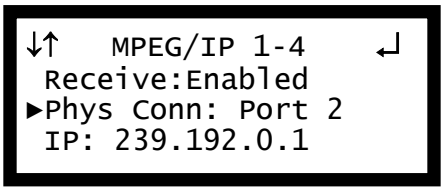
Transmit 2

1. Use the △ and ▽ buttons to move the cursor to “Transmit 2”, then press the ENTER button.
2. Press the ENTER button one more time to get to the Edit screen.
3. Use the △ and ▽ buttons to move the cursor to “Transmit:” then press the ENTER button.
4. Use the △ and ▽ buttons to change the selection to, “Enabled”, then press the ENTER button to save the selection.



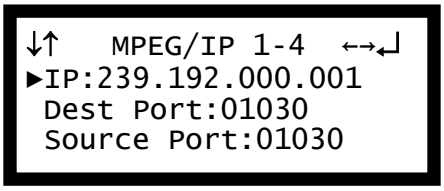


5. Use the △ and ▽ buttons to move the cursor to “Phys Conn:” then press the ENTER button.
6. Choose the physical connector using the △ and ▽ buttons (“Port 1” or “Port 2”) then press the ENTER button.



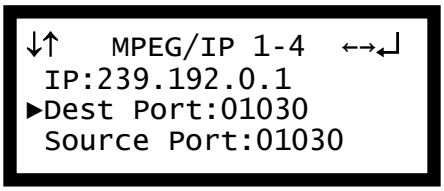
IP

1. Use the △ and ▽ buttons to move the cursor to “IP:” then press the ENTER button.
2. Use the ◁ and ▷ buttons to select the column to edit and use the △ and ▽ buttons to change the IP, then press the ENTER button to save the selection.



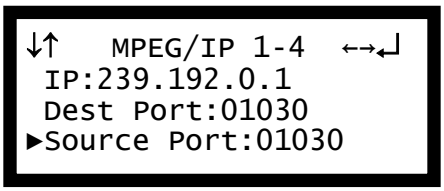
Destination Port

1. Use the △ and ▽ buttons to move the cursor to “Dest Port:” then press the ENTER button.
2. Use the ◁ and ▷ buttons to select the column to edit and use the △ and ▽ buttons to change the destination port (1025 – 65536), then press the ENTER button to save the selection.



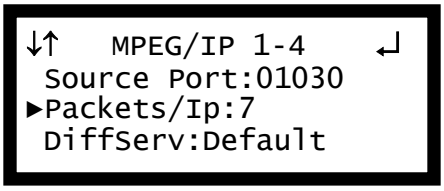
Source Port

1. Use the △ and ▽ buttons to move the cursor to “Source Port:” then press the ENTER button.
2. Use the ◁ and ▷ buttons to select the column to edit and use the △ and ▽ buttons to change the destination port (1025 – 65536), then press the ENTER button to save the selection.



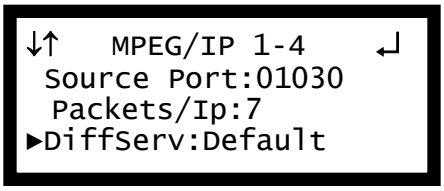
Packets Per Frame

1. Use the △ and ▽ buttons to move the cursor to “Packets/Ip:” then press the ENTER button.
2. Use the ◁ and ▷ buttons to select the column to edit and use the △ and ▽ buttons to change the number of packets per frame (1 –7), then press the ENTER button to save the selection.



Differentiated Services

1. Use the △ and ▽ buttons to move the cursor to “DiffServ:” then press the ENTER button.
2. Use the ◁ and ▷ buttons to select the desired differentiated services (“Default”, “AF11”, “AF12”, “AF13”, “AF21”, “AF22”, “AF23”, “AF31”, “AF32”, “AF33”, “AF41”, “AF42”, “AF43”, “EF”), then press the ENTER button to save the selection.



4.13 Dual MPEG over IP output with PID filtering – Option NRD00H13AA

General Information

Install Location: Installs in 1–2 through 1–4 and/or 2–2 through 2–4.
O: (2) 10/100/1000 Auto-negotiating Base-T RJ-45 Ethernet Port

Supported Formats: Transmit: UDP only

Description: This card supports PID filtering and automatic table modification. The NRD00H13AA output cardwill use two Ethernet connections independently to transmit MPEG2 transport streams over IP networks from a valid input source (ASI, DVB-S2, IP input, etc.) A multi program transport stream (MPTS) input can be reduced into as many as 5 output transport streams. Any combination of services present in the source stream may be selected for the output transport stream. Each output IP stream can then be routed to one of two Ethernet ports as desired. The NRD00H13AA card can also adapt the transport stream bitrate and recalculate the PCR values in the output transport streams to be correct for the new multiplex.
Up to 4 cards can be installed per chassis

Menu Control

This menu is used to set the Default Gateway Port, configure ICMP, find the MAC address, and setup the IP addresses, Subnet Masks, and Gateways for both ports on the PID Filtering card. These settings need to be set to proper values for the network that the unit is being used on. These values can usually be obtained from the local network administrator.

1. Press the MENU button.
2. Use the △ and ▽ buttons to move the cursor to “PID Filter IP NetCfg”, then press the ENTER button.

```
↓↑       Menu        ↵
►PID Filter IP NetCfg
 Genlock Reference
 System
```

Default Gateway Port:

1. To set Default Gateway Port, use the △ and ▽ buttons to move the cursor to “Set Default Gw Port”, then press the ENTER button.

```
↓↑ PID Filter IP Cfg ↵
 Port 1
 Port 2
►Set Default Gw Port
```

2. Press ENTER again and use the △ and ▽ buttons to select “Port1” or “Port2”, then press the ENTER button.

```
↓↑ PID Filter 1-4 IP ↵
► Default Gw:Port
```

ICMP(Ping):

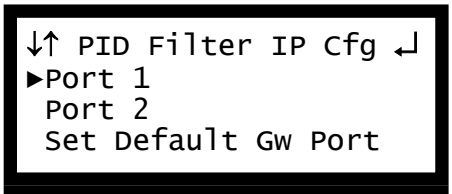
1. Use the △ and ▽ buttons to move the cursor to “Set ICMP(Ping)”, then press the ENTER button.

```
↓↑ PID Filter IP Cfg ↵
 Port 2
 Set Default Gw Port
►Set ICMP(Ping)
```

2. Press ENTER again and use the △ and ▽ buttons to select “Enabled” or “Disabled”, then press the ENTER button.

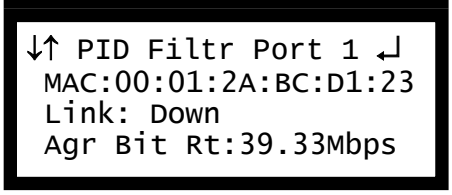
Port Setup

1. Select “Port 1” or “Port 2” and then press the ENTER button.



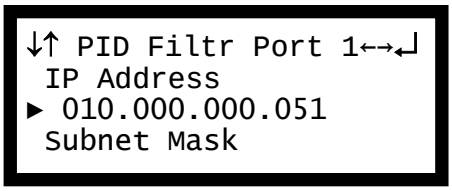
2. The MAC address is now displayed for the port that was chosen. The Link status and Agr Bit Rate is also displayed.

3. Press the ENTER button.



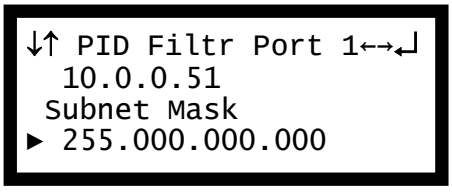
IP Address/Subnet Mask/Gateway

1. Use the △ and ▽ buttons to move the cursor to “IP Address”, then press the ENTER button.

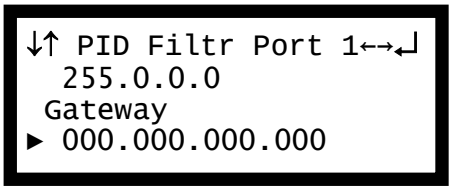


2. Use the ◁ and ▷ buttons to select the column to edit and use the △ and ▽ buttons to change the IP, then press the ENTER button to save the selection.

3. The cursor will now be on, “Subnet Mask”.



4. Use the ◁ and ▷ buttons to select the column to edit and use the △ and ▽ buttons to change the Subnet Mask, then press the ENTER button to save the selection.
5. The cursor will now be on, “Gateway.”



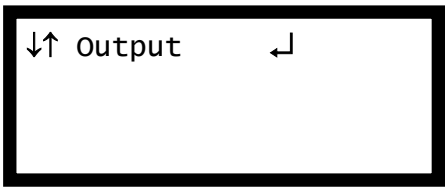
6. Use the ◁ and ▷ buttons to select the column to edit and use the △ and ▽ buttons to change the Gateway, then press the ENTER button to save the selection.

Output Control

1. Press the OUTPUT button.

Note: For dual units, select RDS1 or RDS2, then press ENTER.

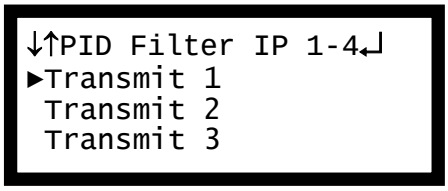
2. Use the △ and ▽ buttons to move the cursor to the "PID Filter IP" card of the specific slot (e.g. 1-4). Notice the location diagram in the upper right corner of the screen changes as the cursor moves by each card.
3. Press the ENTER button once to display the selection screen for "Transmit 1", "Transmit 2", "Transmit 3", Transmit 4", and "Transmit 5" of the PID Filter IP card.



Transmit 1

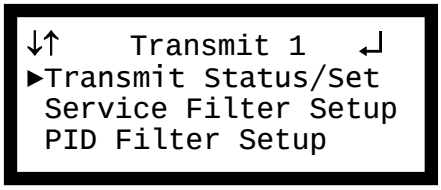
Note: Transmit 2-5 can be set up using the same instructions

1. Use the △ and ▽ buttons to move the cursor to "Transmit 1", then press the ENTER button.



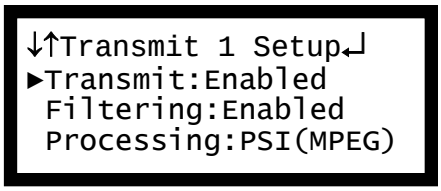
Transmit Status/Set

1. Use the △ and ▽ buttons to move the cursor to "Transmit Status/Set", then press the ENTER button. The status screen is now displayed.



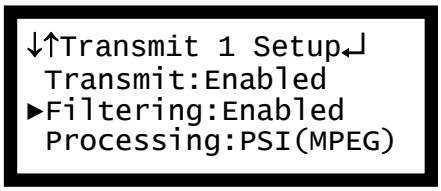
2. Press the ENTER button one more time to get to the Edit screen.

3. Use the △ and ▽ buttons to move the cursor to "Transmit:" then press the ENTER button.

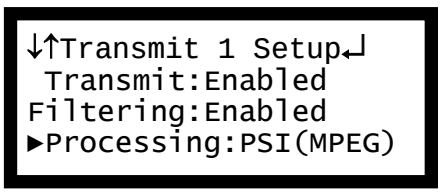


4. Use the △ and ▽ buttons to set the Transmit to "Enabled" or "Disabled", then press the ENTER button to save the selection.

5. Use the △ and ▽ buttons to move the cursor to "Filtering:" then press the ENTER button.



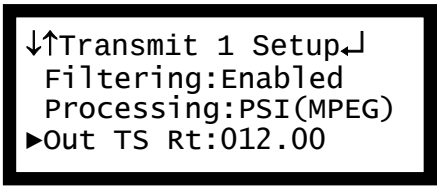
6. Use the △ and ▽ buttons to set the Filtering to "Enabled" or "Disabled", then press the ENTER button to save the selection.
7. Use the △ and ▽ buttons to move the cursor to "Processing:" then press the ENTER button.



8. Use the △ and ▽ buttons to set the Filtering to "PSI(MPEG)" or "SI(DVB)", then press the ENTER button to save the selection.

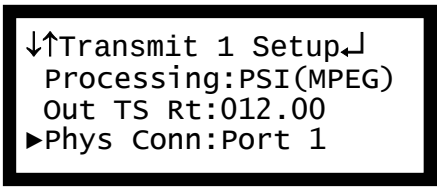
9. Use the △ and ▽ buttons to move the cursor to "Out TS Rt:" then press the ENTER button.

10. Use the ◁ and ▷ buttons to select the column to edit and use the △ and ▽ buttons to change the Output Bitrate, then press the ENTER button to save the selection.



11. Use the △ and ▽ buttons to move the cursor to "Phys Conn:" then press the ENTER button.

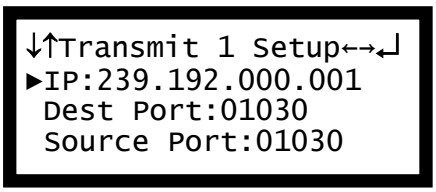
12. Use the △ and ▽ buttons to set the Filtering to "Port 1" or "Port 2", then press the ENTER button to save the selection.



IP

1. Use the △ and ▽ buttons to move the cursor to "IP:" then press the ENTER button.

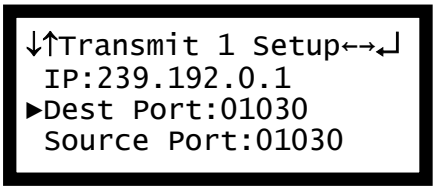
2. Use the ◁ and ▷ buttons to select the column to edit and use the △ and ▽ buttons to change the IP, then press the ENTER button to save the selection.



Destination Port

1. Use the △ and ▽ buttons to move the cursor to "Dest Port:" then press the ENTER button.

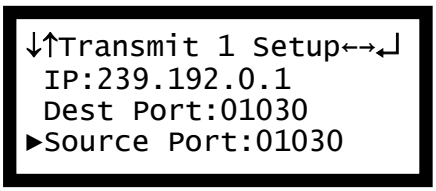
2. Use the ◁ and ▷ buttons to select the column to edit and use the △ and ▽ buttons to change the destination port (1025 – 65536), then press the ENTER button to save the selection.



Source Port

1. Use the △ and ▽ buttons to move the cursor to "Source Port:" then press the ENTER button.

2. Use the ◁ and ▷ buttons to select the column to edit and use the △ and ▽ buttons to change the destination port (1025 – 65536), then press the ENTER button to save the selection.



Packets Per Frame

1. Use the △ and ▽ buttons to move the cursor to "Packets/Ip:" then press the ENTER button.

2. Use the ◁ and ▷ buttons to select the column to edit and use the △ and ▽ buttons to change the number of packets per frame (1 –7), then press the ENTER button to save the selection.

Time To Live

1. Use the △ and ▽ buttons to move the cursor to "TTL:" then press the ENTER button.

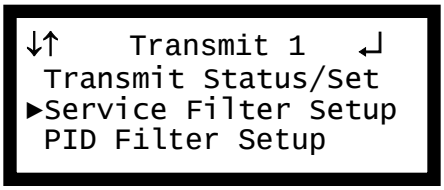
2. Use the ◁ and ▷ buttons to select the column to edit and use the △ and ▽ buttons to change to a value between "000" and "255", then press the ENTER button to save the selection.

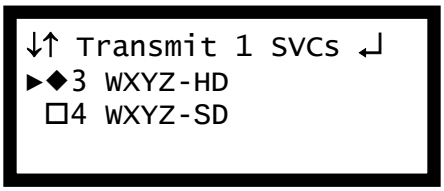
Service Filter Setup

1. Use the △ and ▽ buttons to move the cursor to "Service Filter Setup", then press the ENTER button.

2. Use the △ and ▽ buttons to move the cursor to the desired program, then press the ENTER button.

3. Use the △ and ▽ buttons to turn on filtering for the desired program by changing the symbol from ☐ to ◆, then press the ENTER button.



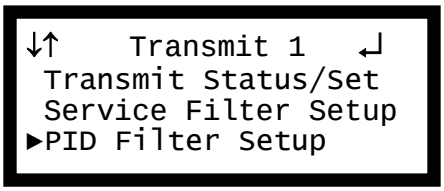


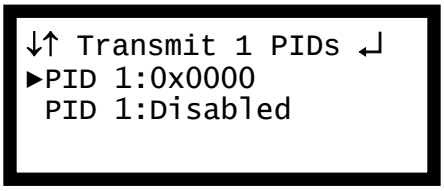
PID Filter Setup

1. Use the △ and ▽ buttons to move the cursor to "PID Filter Setup", then press the ENTER button.

2. Use the △ and ▽ buttons to move the cursor to "PID 1:0x", then press the ENTER button.

3. Use the ◁ and ▷ buttons to select the column to edit and use the △ and ▽ buttons to set the PID to a Hex value, then press the ENTER button to save the selection.

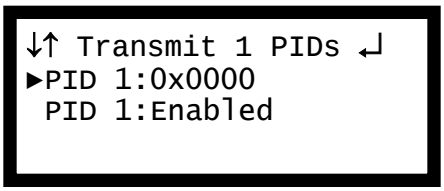




Note: Use the same steps to set the PID value for PIDs 2-10.

4. Use the △ and ▽ buttons to move the cursor to “PID 1:”, then press the ENTER button.
5. Use the △ and ▽ buttons to set the PID 1 to “Enabled” or “Disabled”, then press the ENTER button to save the selection.

Note: Use the same steps to Enable or Disable PIDs 2-10.



4.14 MPEG-2/MPEG-4 4:2:0 Decoder (1 Video, 2 Audio) – Basic feature

General Information

Install Location: Factory Installed feature

I/O: The input and output is done through the various other I/O cards. (e.g. NRD00HCSAA)

Supported Formats: MPEG2, MPEG-4.

Description: : Decodes MPEG2, MPEG4, video and audio. The basic RD5000 decodes up to 2 audio PID. With option NRD00H07AA the RD5000 decoder can decode up to 4 audio PID. The RD5002 decodes up to 2 audio PID for RDS1 and 2 audio PID for RDS2. Genlock is supported.

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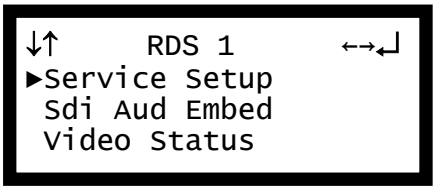
Decoder Setup

To setup the unit to be able to decode the incoming audio and video use the following steps.

1. Press the HOME button to bring the display back to the RDS status screen.
2. Press the ◁ button to access the RDS 1 Decoder Menu.

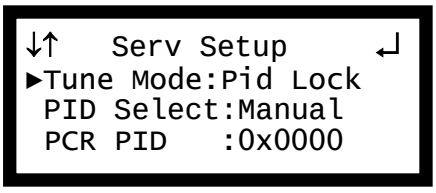
Note: For dual units, all of the following instructions apply exactly the same except, use the ▷ button to access the RDS 2 Decoder Menu.

3. Use the △ and ▽ buttons to move the cursor to “Service Setup”, then press the ENTER button.
4. Press the ENTER button again to display the Edit screen for the RDS 1 Decoder.



Tune Mode

1. Use the △ and ▽ buttons to move the cursor to “Tune Mode:” then press the ENTER button.
2. Use the △ and ▽ buttons to select the desired mode (“Auto”, “No PSI”, “PID Lock”, “Priority”), then press the ENTER button to save the selection.



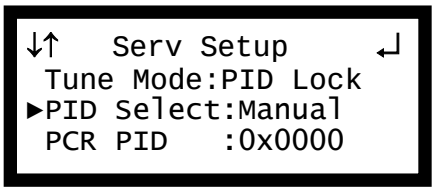
PID Lock Mode

This mode is the most desirable and will produce the most consistent output. If possible this mode should *always* be used.

PID Select

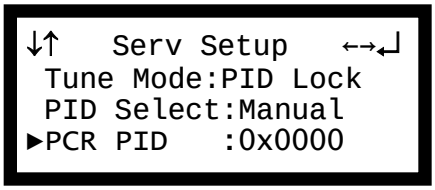
PID Select determines how the PID will be entered during the following steps. “Manual” mode allows *any* PID to be entered. In “List” mode, the unit will only allow the PIDs to be entered that are in the PMT. In the following steps, only the △ and ▽ buttons are needed to change the PID if this option is set to “List.”

1. Use the △ and ▽ buttons to move the cursor to “PID Select:” then press the ENTER button.
2. Use the △ and ▽ buttons to select either “Manual” or “List”, then press the ENTER button to save the selection.



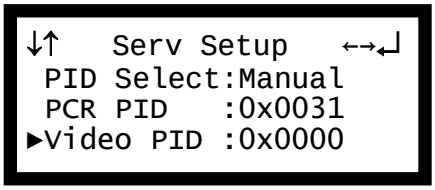
PCR

1. Use the △ and ▽ buttons to move the cursor to “PCR PID :” then press the ENTER button.
2. Use the ◁ and ▷ buttons to select the column to edit and use the △ and ▽ buttons to set the PID, then press the ENTER button to save the selection.



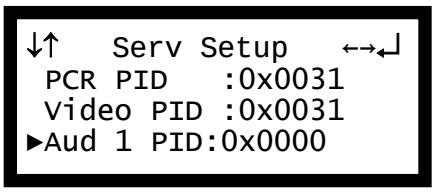
Video

1. Use the △ and ▽ buttons to move the cursor to “Video PID :” then press the ENTER button.
2. Use the ◁ and ▷ buttons to select the column to edit and use the △ and ▽ buttons to set the PID, then press the ENTER button to save the selection.



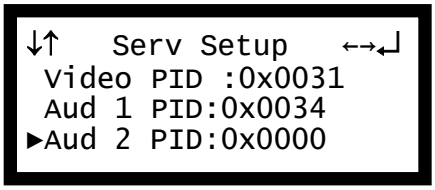
Audio 1 PID

1. Use the △ and ▽ buttons to move the cursor to “Aud 1 PID:” then press the ENTER button.
2. Use the ◁ and ▷ buttons to select the column to edit and use the △ and ▽ buttons to set the PID, then press the ENTER button to save the selection.



Audio 2 PID

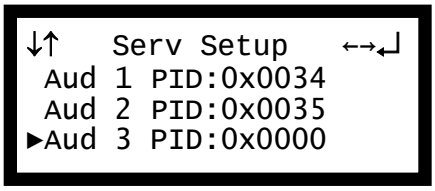
1. Use the △ and ▽ buttons to move the cursor to “Aud 2 PID:” then press the ENTER button.
2. Use the ◁ and ▷ buttons to select the column to edit and use the △ and ▽ buttons to set the PID, then press the ENTER button to save the selection.



Audio 3 PID

Note: This menu is only available on RD5000 unit equipped with a NRD00H07AA option .

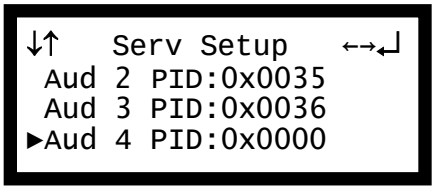
1. Use the △ and ▽ buttons to move the cursor to “Aud 3 PID:” then press the ENTER button.
2. Use the ◁ and ▷ buttons to select the column to edit and use the △ and ▽ buttons to set the PID, then press the ENTER button to save the selection.



Audio 4 PID

Note: This menu is only available on RD5000 unit equipped with a NRD00H07AA option .

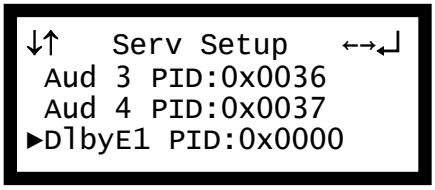
1. Use the △ and ▽ buttons to move the cursor to “Aud 4 PID:” then press the ENTER button.
2. Use the ◁ and ▷ buttons to select the column to edit and use the △ and ▽ buttons to set the PID, then press the ENTER button to save the selection.



DolbyE 1

Note: This option is only available if there is an NRD00HA0AA audio output card installed.

1. Use the △ and ▽ buttons to move the cursor to “DlbyE1 PID:” then press the ENTER button.
2. Use the ◁ and ▷ buttons to select the column to edit and use the △ and ▽ buttons to set the PID, then press the ENTER button to save the selection.

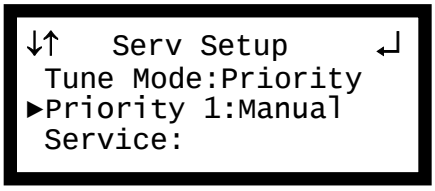


Priority Mode

This mode is generally used with two identical streams for redundancy.

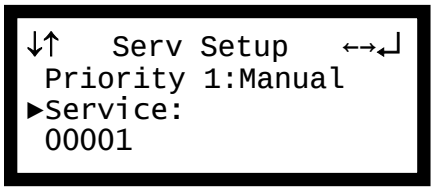
Priority 1

1. Use the △ and ▽ buttons to move the cursor to “Priority 1:” then press the ENTER button.
2. Use the △ and ▽ buttons to select either “Manual” or “List”, then press the ENTER button to save the selection.



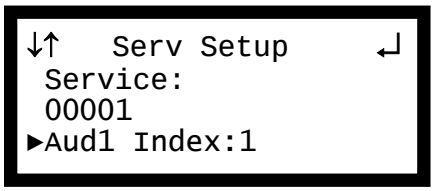
Service

1. Use the △ and ▽ buttons to move the cursor to “Service:” then press the ENTER button.
2. Use the ◁ and ▷ buttons to select the column to edit and use the △ and ▽ buttons to select the program, then press the ENTER button to save the selection.



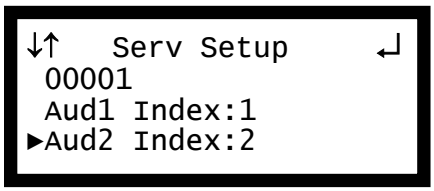
Audio 1 Index

1. Use the △ and ▽ buttons to move the cursor to “Aud1 Index:” then press the ENTER button.
2. Use the △ and ▽ buttons to set the desired audio index (0 – 65535), then press the ENTER button to save the selection.



Audio 2 Index

1. Use the △ and ▽ buttons to move the cursor to “Audio 2 Index:” then press the ENTER button.
2. Use the △ and ▽ buttons to set the desired audio index (0 – 65535), then press the ENTER button to save the selection.



Note: Use the previous steps to setup the Priority 2 as well.

Audio 3 Index

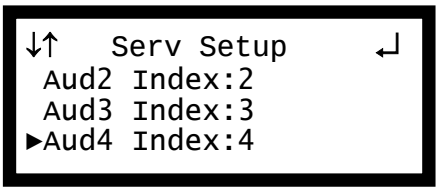
Note: This menu is only available on RD5000 unit equipped with a NRD00H07AA option .

1. Use the △ and ▽ buttons to move the cursor to “Aud3 Index:” then press the ENTER button.
2. Use the △ and ▽ buttons to set the desired audio index (0 – 65535), then press the ENTER button to save the selection.

Audio 4 Index

Note: This menu menu is only available on RD5000 unit equipped with a NRD00H07AA option .

1. Use the △ and ▽ buttons to move the cursor to "Audio 4 Index:" then press the ENTER button.
2. Use the △ and ▽ buttons to set the desired audio index (0 – 65535), then press the ENTER button to save the selection.



Note: Use the previous steps to setup the Priority 2 as well.

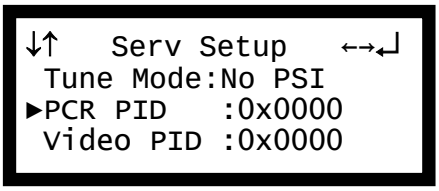
No PSI Mode

This mode should only be used if both the PID information and audio/video formats are known about the stream.

Note: This menu is only available if the "Tune Mode" is set to "No PSI".

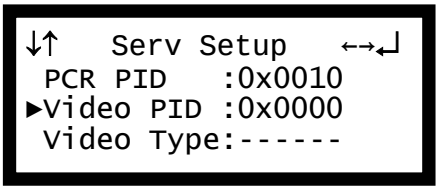
PCR PID

1. Use the △ and ▽ buttons to move the cursor to "PCR PID :" then press the ENTER button.
2. Use the ◁ and ▷ buttons to select the column to edit, then use the △ and ▽ buttons to set the desired PCR PID in the stream, then press the ENTER button to save the PID.



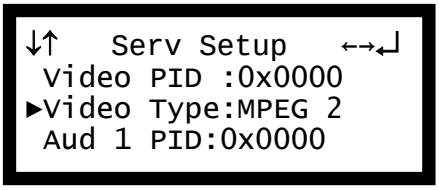
Video PID

1. Use the △ and ▽ buttons to move the cursor to "Video PID :" then press the ENTER button.
2. Use the ◁ and ▷ buttons to select the column to edit, then use the △ and ▽ buttons to set the desired Video PID in the stream, then press the ENTER button to save the PID.



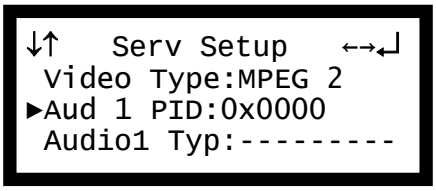
Video Type

1. Use the △ and ▽ buttons to move the cursor to "Video Type:" then press the ENTER button.
2. Use the △ and ▽ buttons to select the video type ("MPEG 2" or "H.264") on the PID chosen above, then press the ENTER button.



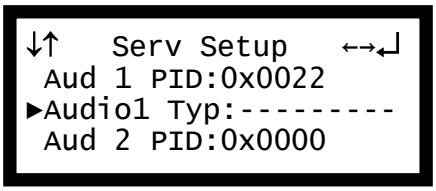
Audio 1 PID

1. Use the △ and ▽ buttons to move the cursor to “Aud 1 PID:” then press the ENTER button.
2. Use the ◁ and ▷ buttons to select the column to edit, then use the △ and ▽ buttons to select the desired Audio PID in the stream, then press the ENTER button to save the PID.



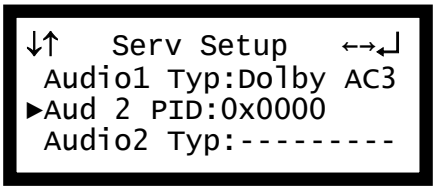
Audio 1 Type

1. Use the △ and ▽ buttons to move the cursor to “Audio1 Typ:” then press the ENTER button.
2. Use the △ and ▽ buttons to select the audio type (“Dolby AC3”, “AAC ADTS”, “AAC LOAS”, “Dolby D +”, “MPEG 1”, “MPEG 2”) on the PID chosen above, then press the ENTER button.



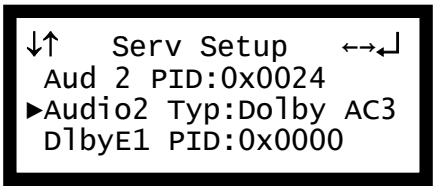
Audio 2 PID

1. Use the △ and ▽ buttons to move the cursor to “Aud 2 PID:” then press the ENTER button.
2. Use the ◁ and ▷ buttons to select the column to edit, then use the △ and ▽ buttons to select the desired Audio PID in the stream, then press the ENTER button to save the PID.



Audio 2 Type

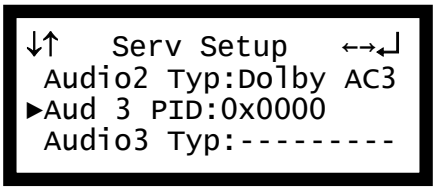
1. Use the △ and ▽ buttons to move the cursor to “Audio2 Typ:” then press the ENTER button.
2. Use the △ and ▽ buttons to select the audio type (“Dolby AC3”, “AAC ADTS”, “AAC LOAS”, “Dolby D +”, “MPEG 1”, “MPEG 2”) on the PID chosen above, then press the ENTER button.



Audio 3 PID

Note: This menu is only available on RD5000 unit equipped with a NRD00H07AA option .

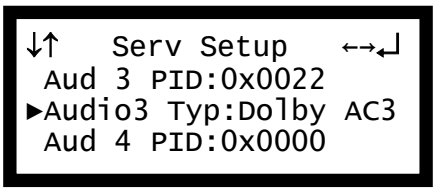
1. Use the △ and ▽ buttons to move the cursor to “Aud 3 PID:” then press the ENTER button.
2. Use the ◁ and ▷ buttons to select the column to edit, then use the △ and ▽ buttons to select the desired Audio PID in the stream, then press the ENTER button to save the PID.



Audio 3 Type

Note: This menu is only available on RD5000 unit equipped with a NRD00H07AA option .

1. Use the △ and ▽ buttons to move the cursor to “Audio1 Typ:” then press the ENTER button.
2. Use the △ and ▽ buttons to select the audio type (“Dolby AC3”, “AAC ADTS”, “AAC LOAS”, “Dolby D +”, “MPEG 1”, “MPEG 2”) on the PID chosen above, then press the ENTER button.



Audio 4 PID

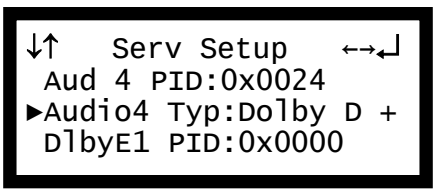
Note: This menu is only available on RD5000 unit equipped with a NRD00H07AA option .

3. Use the △ and ▽ buttons to move the cursor to “Aud 4 PID:” then press the ENTER button.
4. Use the ◁ and ▷ buttons to select the column to edit, then use the △ and ▽ buttons to select the desired Audio PID in the stream, then press the ENTER button to save the PID.

Audio 4 Type

Note: This menu is only available on RD5000 unit equipped with a NRD00H07AA option .

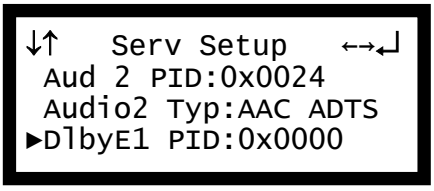
3. Use the △ and ▽ buttons to move the cursor to “Audio4 Typ:” then press the ENTER button.
4. Use the △ and ▽ buttons to select the audio type (“Dolby AC3”, “AAC ADTS”, “AAC LOAS”, “Dolby D +”, “MPEG 1”, “MPEG 2”) on the PID chosen above, then press the ENTER button.



DolbyE 1

Note: This option is only available if there is an NRD00HA0AA audio output card installed.

1. Use the △ and ▽ buttons to move the cursor to "DlbyE1 PID:" then press the ENTER button.
2. Use the ◁ and ▷ buttons to select the column to edit and use the △ and ▽ buttons to set the Dolby E1 PID, then press the ENTER button to save the selection.



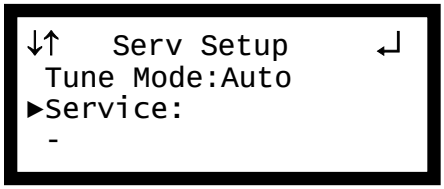
Auto Mode

This mode should only be used if no PID information is known about the stream.

Auto Program

Note: This menu is only available if the "Tune Mode" is set to "Auto".

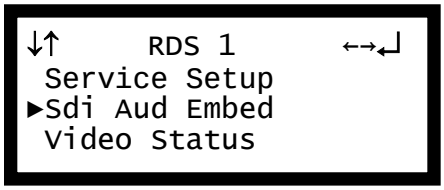
1. Use the △ and ▽ buttons to move the cursor to "Auto" then press the ENTER button.
2. Use the △ and ▽ buttons to select the desired Service number in the stream, then press the ENTER button to save the selection.

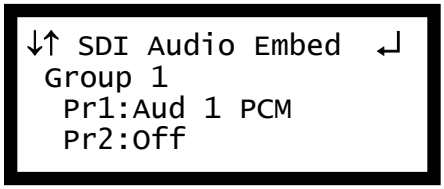


SDI Audio Embedding

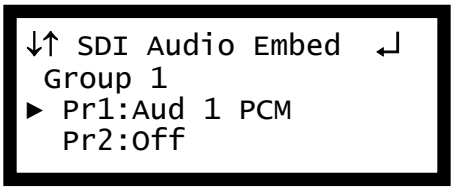
SDI Audio Embedding places decoded or pass through audio in the video horizontal space in one of 4 available locations. The 4 locations are Group 1 – pair 1 and pair 2, and Group 2 pair 1 and 2. If there is an NRD00HA0AA audio output card installed, then DolbyE audio can be embedded. To setup the assignment audio to one of the SDI audio embedding locations, use the following steps:

1. Start out at the home screen (where it shows the TS bit rate).
2. Press the ◁ button.
3. Use the △ and ▽ buttons to move the cursor to "Sdi Aud Embed", then press the ENTER button.
4. The current settings are displayed. Press the ENTER button again to edit the settings.





5. Use the △ and ▽ buttons to move the cursor to the pair location for the embedded audio, Group 1 “Pr1” or “Pr2”, and Group 2 “Pr1” or “Pr2”, then press the ENTER button to edit the assigned audio.
6. Use the △ and ▽ buttons to select the audio that is assigned to the pair, “Off”, “Aud 1 PCM”, Aud 1 Dig. Pass”, “Aud 2 PCM”, or “Aud 2 Dig. Pass”. If an NRD00HA0AA audio output card is installed in the RDS, “DolbyE” is an additional audio option. Press the ENTER button to save the selection.



Audio 1 Setup

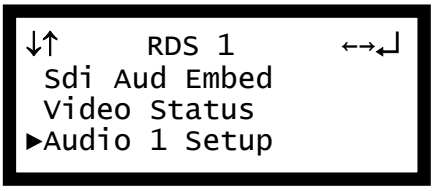
The following menus are used to setup the audio downmix settings.

Note: Refer to Appendix F for the unit Audio Explanation.

Note: These settings do not apply to DolbyE audio.

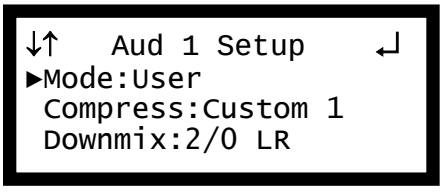
Use the following instructions to setup Audio 1-4 (if equipped).

1. Use the △ and ▽ buttons to move the cursor to “Audio 1 Setup” then press the ENTER button.
2. The current screen shows the status of the audio downmix settings, press the ENTER button again to display the Edit screen.



Mode

1. Use the △ and ▽ buttons to move the cursor to “Mode:” then press the ENTER button.
2. Use the △ and ▽ buttons to select the desired downmix type (“Monitor”, “Transmission”, and User”) then press the ENTER button to save the selection.



Note: The following are set for each Mode:

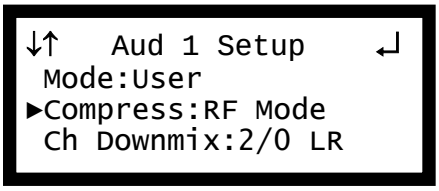
Mode	***Compression***	***Downmix***	***Dynamic Range***
User	*Custom 1*	*2/0 LR*	*Disabled*
Monitor	*Line Mode*	*2/0 LR*	*Enabled*
Transmission	*RF Mode*	*2/0 LtRt*	*Disabled*

Each Mode allows the following to be changed:

- *User: Compression, Downmix, Dynamic Range*
- *Monitor: Compression*
- *Transmission: no changes*

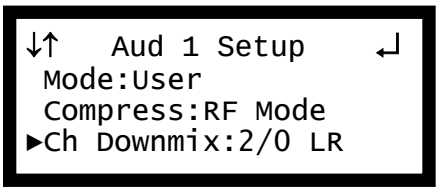
Compression

1. Use the △ and ▽ buttons to move the cursor to "Compress:" then press the ENTER button.
2. Use the △ and ▽ buttons to select the desired compression ("RF Mode", "Line Mode", "Custom 0", "Custom 1") then press the ENTER button to save the selection.



Downmix

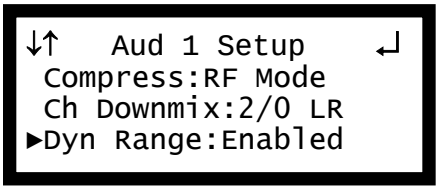
1. Use the △ and ▽ buttons to move the cursor to "Ch Downmix:" then press the ENTER button.
2. Use the △ and ▽ buttons to select the desired downmix ("2/0 LR", "2/0 Auto", "2/0 LtRt", "MonoChan1", "MonoChan2") then press the ENTER button to save the selection.



Note: The "2/0 Auto" is used by Dolby Digital Plus (EAC3) to use "2/0 LR" or "2/0 LtRt" based on the received audio metadata. If the metadata is not present, like for Dolby Digital (AC3), "2/0 LtRt" is used.

Dynamic Range

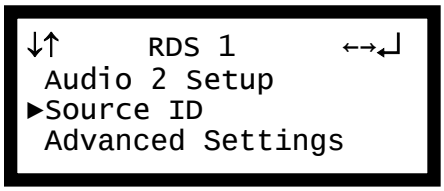
1. Use the △ and ▽ buttons to move the cursor to "Dyn Range:" then press the ENTER button.
2. Use the △ and ▽ buttons to set the Dynamic Range to "Enabled" or "Disabled", then press the ENTER button to save the selection.

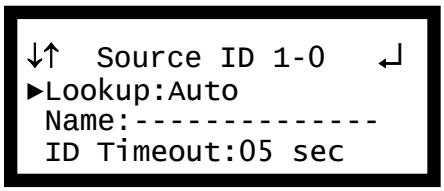


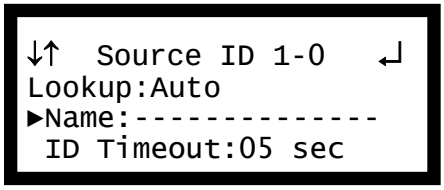
Source ID Setup

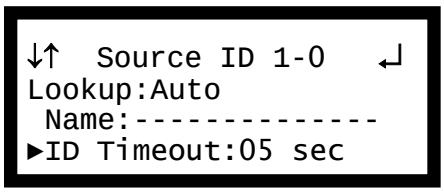
There are two modes that the Source ID can be obtained – Auto or Manual. In Auto mode, the unit attempts to discover the Source ID that is signaled in the stream. The user specifies a timeout for the length of time the unit searches for the Source ID in the stream. If not found, the user entered name is used. In Manual mode, the user entered name is used. To setup the Source ID, use the following steps:

1. Start out at the home screen (where it shows the TS bit rate).
2. Press the ◁ button.
3. Use the △ and ▽ buttons to move the cursor to “Source ID”, then press the ENTER button.
4. Press the ENTER button again to edit the Source ID settings.
5. Use the △ and ▽ buttons to move the cursor to item to be edited, then press the ENTER button to edit the assigned value.
6. For the “Lookup:” value, use the △ and ▽ buttons to select “Auto” or “Manual”. Press the ENTER button to save the selection.
7. For the “Name:” value, use the ◁ and ▷ buttons to select the column to edit and use the △ and ▽ buttons to select the character. When finished, press the ENTER button to save the selection.
8. For the “ID Timeout:”, use the △ and ▽ buttons to select “05”, “10”, “15”, “20”, “25”, “30”, “60”, “90” or “120” seconds. Press the ENTER button to save the selection.





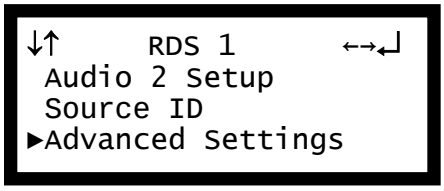


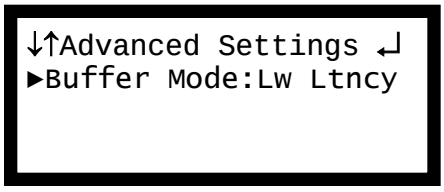


Buffer Mode Video Latency

There are two video latency modes that can be entered – Normal and Low Latency. To setup the video latency mode, use the following steps:

1. Start out at the home screen (where it shows the TS bit rate).
2. Press the ◁ button.
3. Use the △ and ▽ buttons to move the cursor to “Advanced Settings”, then press the ENTER button.
4. Press the ENTER button again to edit the settings.
5. Use the △ and ▽ buttons to select the Buffer Mode value “Normal” or “Lw Ltncy”, then press the ENTER button to save the selection.





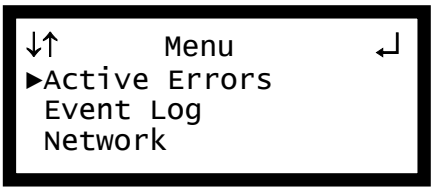
4.15 Active Errors

Description: Whenever an error occurs on any of the four internal status indicators in the unit, the Error LED will illuminate on the front panel and the details of the error will be listed in the Active Errors. An extensive listing of errors and their definitions is included in Appendix B.

Active Errors Display

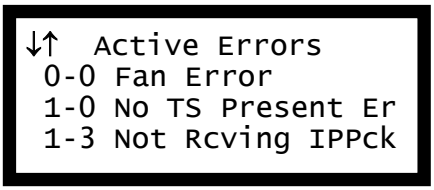
To display the current errors on the unit use the following steps:

1. Press the MENU button.
2. Use the △ and ▽ buttons to move the cursor to “Active Errors”, then press the ENTER button.



3. Use the △ and ▽ buttons to scroll through the list of errors.
4. Here is the meaning of the error codes:

   - 0-0 global (such as fan error)
   - 1-1 error in slot 1 (bottom row)
   - 1-2 error in slot 2 (bottom row)
   - 1-3 error in slot 3 (bottom row)
   - 1-4 error in slot 4 (bottom row)
   - 1-5 error in decoder board for RDS1
   - 2-1 error in slot 1 (top row)
   - 2-2 error in slot 2 (top row)
   - 2-3 error in slot 3 (top row)
   - 2-4 error in slot 4 (top row)
   - 2-5 error in decoder board for RDS2
   - 3-2 error in decoder board for RDS1



5. The ◁ and ▷ buttons can be used to scroll left or right if the error listing text cannot be entirely displayed on the front panel.

4.16 Event Log

Description: The unit has user selectable event logging that it stores to a list. The list includes the date and time of each event, a short description of the event, and which card was affected by the event. To configure the unit to log specific events from a predefined list, use the steps below.

Event Log

To setup and display the current errors on the unit use the following steps:

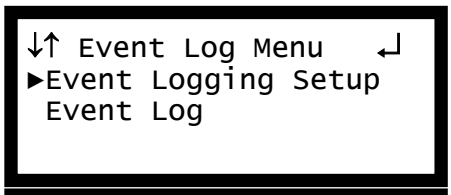
1. Press the MENU button.
2. Use the △ and ▽ buttons to move the cursor to "Event Log," then press the ENTER button to enter the "event Log Menu."

Event Logging Setup

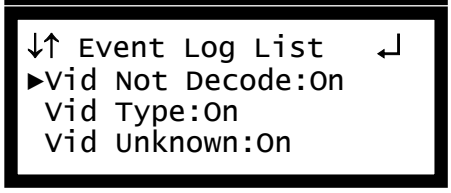
Note: The Event Log List is dependent on the installed options.

To setup which events will log into the Event Log, follow the steps below:

1. Use the △ and ▽ buttons to move the cursor to "Event Logging Setup," then press the ENTER button.



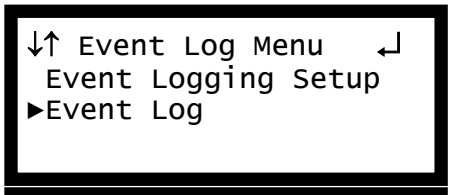
2. Use the △ and ▽ buttons to select which event to turn enable or disable, then press the ENTER button.
3. Select either "On" or "Off", then press the ENTER button.



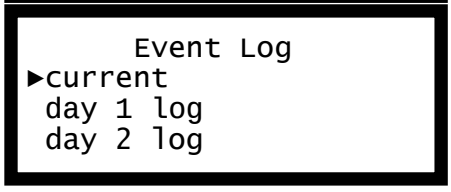
Event Log Display

To display the current errors on the unit use the following steps:

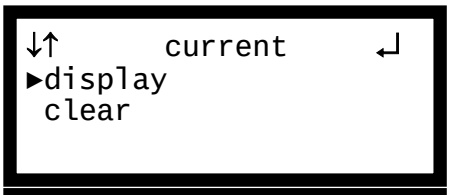
1. Use the △ and ▽ buttons to move the cursor to "Event Log", then press the ENTER button to choose which day to view.



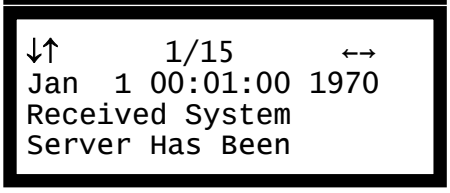
2. Use the △ and ▽ buttons to move the cursor to choose either "current", "day 1 log", "day 2 log" or "day 3 log", then press the ENTER button.



3. Use the △ and ▽ buttons to move the cursor to "display" and press the ENTER button.



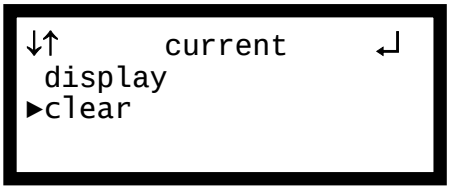
4. Use the △ and ▽ buttons to scroll and view the whole event, and use the ◁ and ▷ buttons to move from one event to another. The "1/15" meant the first listed event of a total of 15 events.



Clear Error List

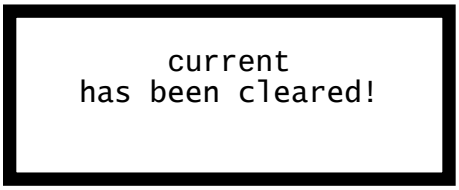
This clears the error log for the log that was selected, either the "current", "day 1 log", "day 2 log" or "day 3 log" error log.

1. Use the △ and ▽ buttons to move the cursor to "display" and press the ENTER button.



CAUTION: If "clear" is selected, all of the events that have been logged under the time selected will be erased from memory, and cannot be recovered.

2. The log selected will be listed followed by "has been cleared!"



4.17 Password Strength

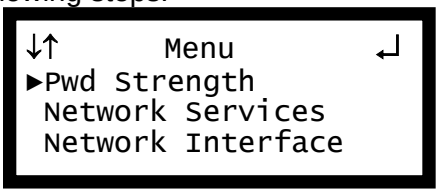
Description: Determines the password strength for access through the Web Client

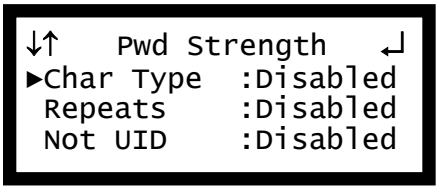
Character Type

If set to enable, the Web Client Password will contain at least three of the following classes : lower case letters, upper case letters, digits, or special characters

To enable/disable Character Type password requirement, use the following steps:

1. Press the MENU button.
2. Use the △ and ▽ buttons to move the cursor to "Pwd Strength", then press the ENTER button.
3. Use the △ and ▽ buttons to move the cursor to "Char Type:" then press the ENTER button.
4. Use the △ and ▽ buttons to change the selection, then press the ENTER button to save the selection.



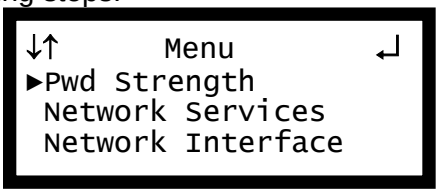


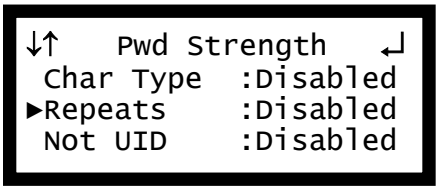
Repeats

If set to enable, no character in the password can be repeated more than three times consecutively

To enable/disable No Repeats password requirement, use the following steps:

1. Press the MENU button.
2. Use the △ and ▽ buttons to move the cursor to "Pwd Strength", then press the ENTER button.
3. Use the △ and ▽ buttons to move the cursor to "Repeats:" then press the ENTER button.
4. Use the △ and ▽ buttons to change the selection, then press the ENTER button to save the selection.



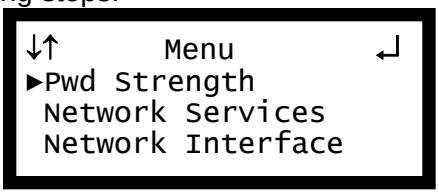


Not User ID

If set to enable, the password cannot be the same as the user ID or the user ID reversed

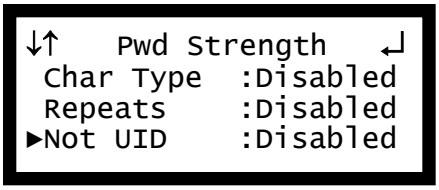
To enable/disable Not User ID password requirement, use the following steps:

1. Press the MENU button.
2. Use the △ and ▽ buttons to move the cursor to "Pwd Strength", then press the ENTER button.



3. Use the △ and ▽ buttons to move the cursor to "Not UID:" then press the ENTER button.

4. Use the △ and ▽ buttons to change the selection, then press the ENTER button to save the selection.



Not In List

If set to enable, the password cannot be any of the following English words or these variants : reversed spelling, changed capitalization of the letters, 1 for i, | for i, ! for i, 1 for l, | for l, ! for l, 0 for o, or $ for s

The following is a list of the words that are disallowed as passwords.

admin
decoder
user
root

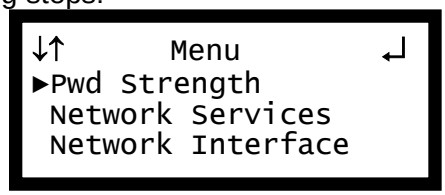
To enable/disable Not In List password requirement, use the following steps:

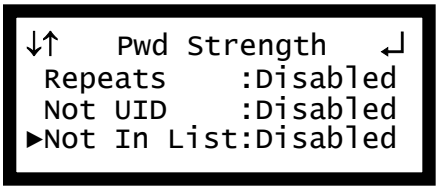
1. Press the MENU button.

2. Use the △ and ▽ buttons to move the cursor to "Pwd Strength", then press the ENTER button.

3. Use the △ and ▽ buttons to move the cursor to "Not In List:" then press the ENTER button.

4. Use the △ and ▽ buttons to change the selection, then press the ENTER button to save the selection.





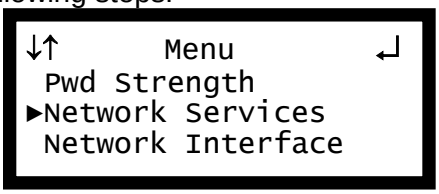
4.18 Network Security

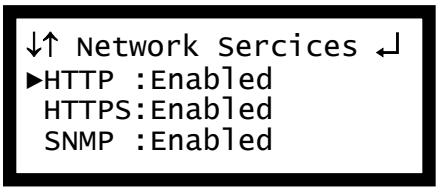
Description: Network Security provides protection from unauthorized manipulation and configurations of an RD5000 / RD5002 when it is connected to the network.

HTTP

To enable/disable HTTP access to the RD5000 / RD5002, use the following steps:

1. Press the MENU button.
2. Use the △ and ▽ buttons to move the cursor to "Network Services", then press the ENTER button.
3. Use the △ and ▽ buttons to move the cursor to "HTTP:" then press the ENTER button.
4. Use the △ and ▽ buttons to change the selection, then press the ENTER button to save the selection.

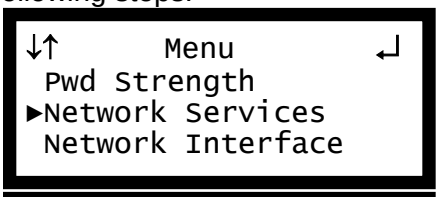


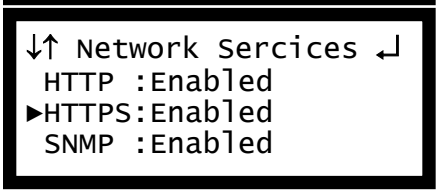


HTTPS

To enable/disable HTTPS access to the RD5000 / RD5002, use the following steps:

1. Press the MENU button.
2. Use the △ and ▽ buttons to move the cursor to "Network Services", then press the ENTER button.
3. Use the △ and ▽ buttons to move the cursor to "HTTPS:" then press the ENTER button.
4. Use the △ and ▽ buttons to change the selection, then press the ENTER button to save the selection.

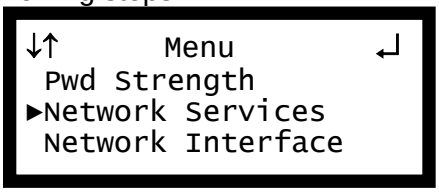


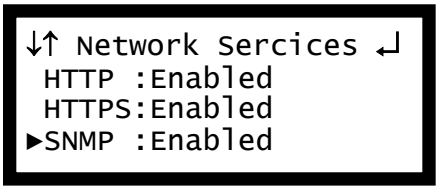


SNMP

To enable/disable SNMP access to the RD5000 / RD5002, use the following steps:

1. Press the MENU button.
2. Use the △ and ▽ buttons to move the cursor to "Network Services", then press the ENTER button.
3. Use the △ and ▽ buttons to move the cursor to "SNMP:" then press the ENTER button.
4. Use the △ and ▽ buttons to change the selection, then press the ENTER button to save the selection.

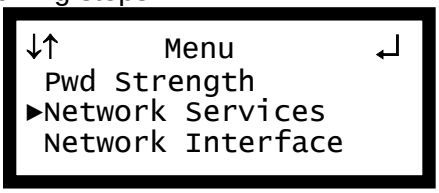


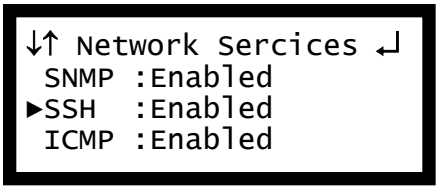


SSH

To enable/disable SSH access to the RD5000 / RD5002, use the following steps:

1. Press the MENU button.
2. Use the △ and ▽ buttons to move the cursor to "Network Services", then press the ENTER button.
3. Use the △ and ▽ buttons to move the cursor to "SSH:" then press the ENTER button.
4. Use the △ and ▽ buttons to change the selection, then press the ENTER button to save the selection.

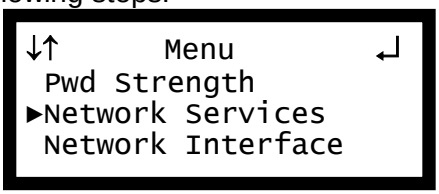


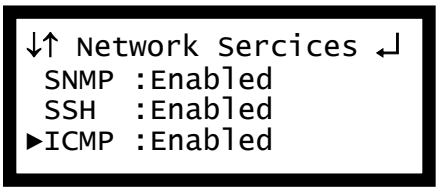


ICMP

To enable/disable ICMP access to the RD5000 / RD5002, use the following steps:

1. Press the MENU button.
2. Use the △ and ▽ buttons to move the cursor to "Network Services", then press the ENTER button.
3. Use the △ and ▽ buttons to move the cursor to "ICMP:" then press the ENTER button.
4. Use the △ and ▽ buttons to change the selection, then press the ENTER button to save the selection.





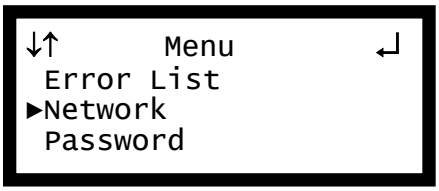
4.19 Network Setup

Description: The unit can be setup on a network connection to allow remote management and SNMP configuration. For these features to work, the network settings for the unit must first be configured properly for the network it is connected to.

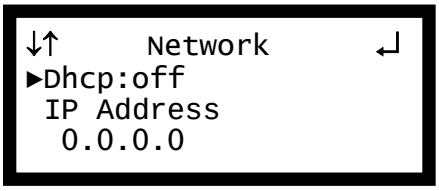
Static IP Address

To setup the unit with a static IP address, use the following steps:

1. Press the MENU button.
2. Use the △ and ▽ buttons to move the cursor to "Network", then press the ENTER button.

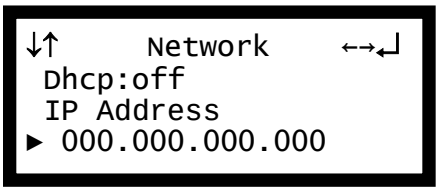


3. Use the △ and ▽ buttons to move the cursor to "DHCP:" then press the ENTER button.
4. Use the △ and ▽ buttons to change the selection to, "off", then press the ENTER button to save the selection.

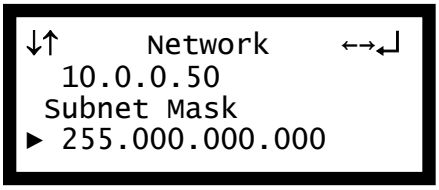


IP Address/Subnet Mask/Gateway

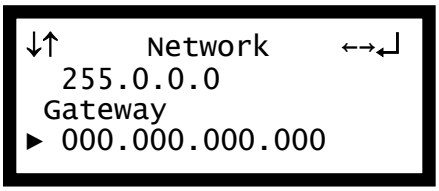
1. Use the △ and ▽ buttons to move the cursor to "IP Address", then press the ENTER button.
2. Use the ◁ and ▷ buttons to select the column to edit and use the △ and ▽ buttons to change the IP, then press the ENTER button to save the selection.



3. The cursor will now be on, "Subnet Mask."
4. Use the ◁ and ▷ buttons to select the column to edit and use the △ and ▽ buttons to change the Subnet Mask, then press the ENTER button to save the selection.



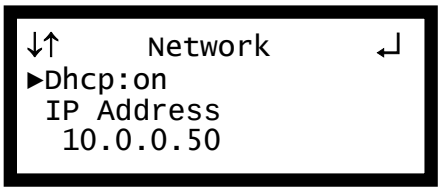
5. The cursor will now be on, "Gateway."
6. Use the ◁ and ▷ buttons to select the column to edit and use the △ and ▽ buttons to change the Gateway, then press the ENTER button to save the selection.



DHCP

The unit can be configured to use DHCP to obtain an IP address/Subnet Mask/Gateway.

1. Use the △ and ™▽ buttons to move the cursor to “Dhcp:” then press the ENTER button.
2. Use the △ and ▽ buttons to change the selection to, “on”, then press the ENTER button to save the selection.



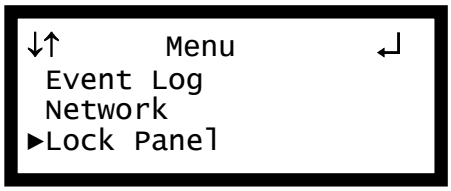
Note: It may take up to a minute for the unit to obtain an IP address. During this time the unit will display a “busy” message next to DHCP.

4.20 Panel Lock

Description: The unit has the option to lock out the front panel with a user defined password. Follow the steps below to the unit front panel. A Locked front panel prevents the user from changing any of the settings. All menu status displays are still available.

Locking

1. Press the MENU button.
2. Use the △ and ▽ buttons to move the cursor to “Lock Panel” then press the ENTER button.



Note: In order to lock the Front Panel, the unit must have a password. When Locking for the first time, user is prompted to enter a password. The message “No Password set. Please set Password” is displayed and the unit goes to the Set Password menu.

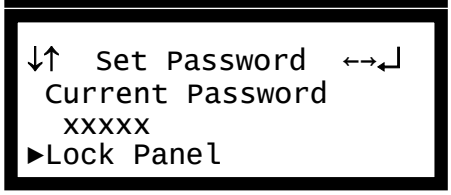
Set Password Menu

To set the password, use the following steps:

1. Use the △ and ▽ buttons to change the character and then the ◁ and ▷ buttons to move to the next character.
2. Press the ENTER button when finished, to save the password. The unit goes to the Lock Menu.

Lock Menu

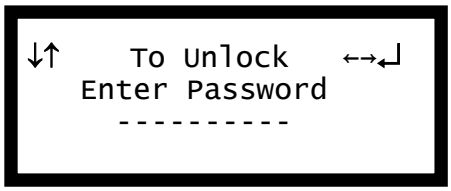
1. The current password is displayed.
2. To change the password, use the △ and ▽ buttons to move to cursor to the shown password and press the ENTER button. The unit displays the Set Password Menu.
3. To lock the front panel, use the △ and ▽ buttons to move to cursor to “Lock Panel” and press the ENTER button.



Unlocking

1. Press the MENU button.
2. Use the △ and ▽ buttons to move the cursor to “Unlock Panel” then press the ENTER button.

3. Use the △ and ▽ buttons to change the character and then the ◁ and ▷ buttons to move to the next character.
4. Press the ENTER button to unlock the front panel.

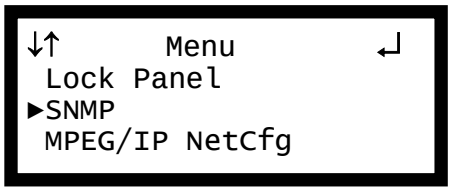


4.21 SNMP Configuration

Description: The trap reporting to SNMP allows the user to set which traps will be sent. SNMP control of the unit requires the unit to identify the "Community" for read only and read/write access. These are configured using the steps below.

To access the SNMP configuration, use the following steps:

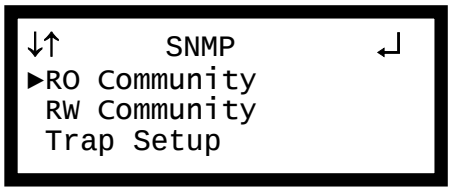
1. Press the MENU button.
2. Use the △ and ▽ buttons to move the cursor to "SNMP", then press the ENTER button.



RO Community Setup

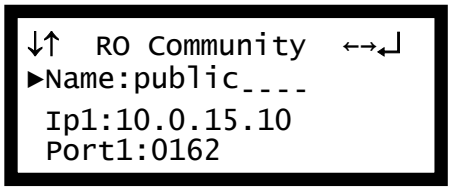
To change the RO Community, follow the steps below:

1. Use the △ and ▽ buttons to move the cursor to "RO Community", then press the ENTER button.



Name

1. Use the △ and ▽ buttons to select "Name:", then press the ENTER button.
2. Use the △ and ▽ buttons to change the character and then the ◁ and ▷ buttons to change the Name, then press the ENTER button to save the selection.

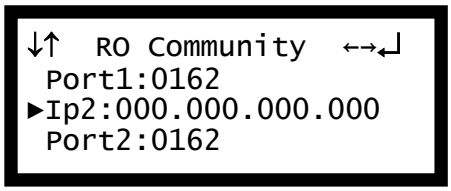


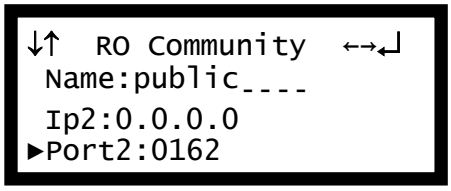
Connection 1

1. Use the △ and ▽ buttons to select "Ip1:", then press the ENTER button.
2. Use the △ and ▽ buttons to change the character and then the ◁ and ▷ buttons to change the IP address, then press the ENTER button to save the selection.
3. Use the △ and ▽ buttons to select "Port1:", then press the ENTER button.
4. Use the △ and ▽ buttons to change the character and then the ◁ and ▷ buttons to change the Port1 value, then press the ENTER button to save the selection.

Connection 2

1. Use the △ and ▽ buttons to select “Ip2:”, then press the ENTER button.
2. Use the △ and ▽ buttons to change the character and then the ◁ and ▷ buttons to change the IP address, then press the ENTER button to save the selection.
3. Use the △ and ▽ buttons to select “Port2:”, then press the ENTER button.
4. Use the △ and ▽ buttons to change the character and then the ◁ and ▷ buttons to change the Port2 value, then press the ENTER button to save the selection.

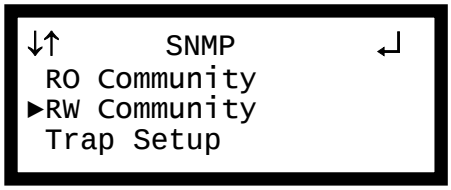




RW Community Setup

To change the RW Community, follow the steps below:

1. Use the △ and ▽ buttons to move the cursor to “RW Community”, then press the ENTER button.



Name

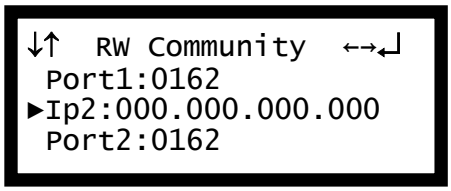
1. Use the △ and ▽ buttons to select “Name:”, then press the ENTER button.
2. Use the △ and ▽ buttons to change the character and then the ◁ and ▷ buttons to change the Name, then press the ENTER button to save the selection.

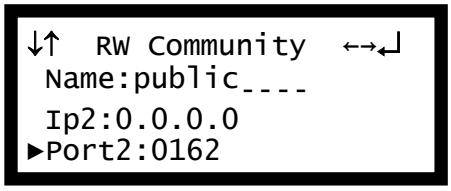
Connection 1

1. Use the △ and ▽ buttons to select “Ip1:”, then press the ENTER button.
2. Use the △ and ▽ buttons to change the character and then the ◁ and ▷ buttons to change the IP address, then press the ENTER button to save the selection.
3. Use the △ and ▽ buttons to select “Port1:”, then press the ENTER button.
4. Use the △ and ▽ buttons to change the character and then the ◁ and ▷ buttons to change the Port1 value, then press the ENTER button to save the selection.

Connection 2

1. Use the △ and ▽ buttons to select “Ip2:”, then press the ENTER button.
2. Use the △ and ▽ buttons to change the character and then the ◁ and ▷ buttons to change the IP address, then press the ENTER button to save the selection.
3. Use the △ and ▽ buttons to select “Port2:”, then press the ENTER button.
4. Use the △ and ▽ buttons to change the character and then the ◁ and ▷ buttons to change the Port2 value, then press the ENTER button to save the selection.



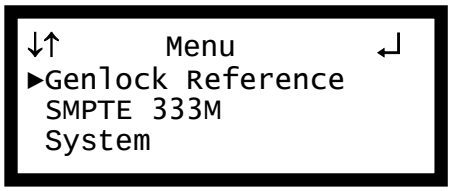


4.22 Genlock Reference

Description: The Genlock Reference is only available with the RD500x. This sets the video format of the reference video that is being used for Genlock.

To set the Genlock Reference on the unit use the following steps:

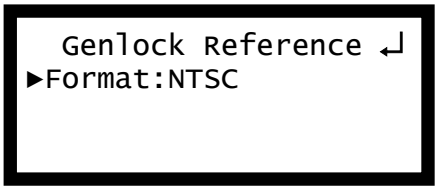
1. Press the MENU button.
2. Use the △ and ▽ buttons to move the cursor to “Genlock Reference” then press the ENTER button.



Setting Genlock Format

To set the Genlock reference format, follow the steps below:

1. Use the △ and ▽ button to move the cursor to “Format:” then press the ENTER button.
2. Use the △ and ▽ buttons to select the desired format, then press the ENTER button to save the selection.



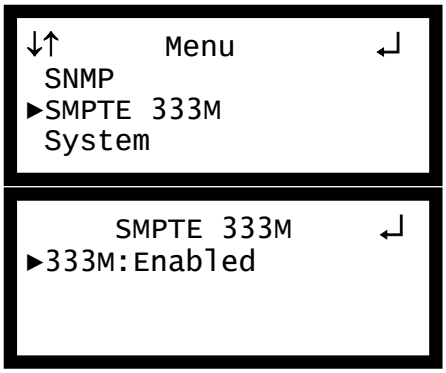
Off		1080i	29.97
NTSC	29.97	1080i	30.00
PAL	29.97	1080p	23.98
720p	50.00	1080p	24.00
720p	59.94	1080p	25.00
720p	60.00	1080p	29.97
1080i	25.00	1080p	30.00

4.23 SMPTE 333M Configuration

Description: The unit can be configured to output SMPTE 333M Closed Caption signals from the SMPTE 333M port on the back of the unit.

Configuration

1. Press the MENU button.
2. Use the △ and ▽ button to move the cursor to “SMPTE 333M” then press the ENTER button.
3. Press the ENTER button one more time to edit, “333M:”
4. Use the △ and ▽ buttons to enable or disable SMPTE 333M, then press the ENTER button to save the selection.



4.24 SCTE35 to SCTE104 Setup – Option NRD00S01AA

Description: The SCTE35 to SCTE104 is used in an application where the unit it is receiving a transport stream with SCTE35 DPI splice messages. The unit extracts those messages from the transport stream and converts them to SCTE104 messages, and embeds them as VANC packets on the SDI output.

Enabling SCTE35 to SCTE104 Capabilities

This is enabled with a "SCTE 35/104" license, see Section 4.26 and 5.13. The license is enabled by entering a License Key and the status of the License is noted in the License "Feature List". The "SCTE 35/104" license can be installed on RD5000 and RD5002 units. The license enables the "SCTE 35/104" capabilities for the entire unit.

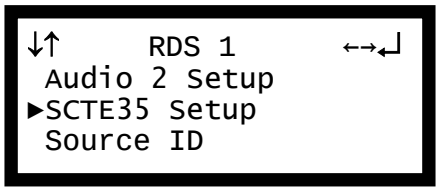
When licensed, the "SCTE35 Setup" setting will be available.

Use the following steps to setup SCTE35 to SCTE104 conversion.

SCTE35 PID

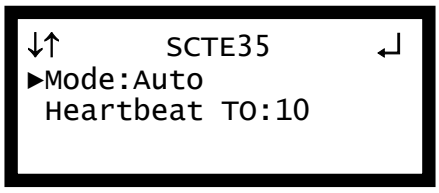
There are two modes that the SCTE35 PID(s) can be entered in, Auto or Manual. In Auto mode the unit attempts to discover the SCTE35 PID(s) as they are signaled in the stream. In Manual mode the user must enter the PID(s) manually using each PID's HEX PID number. To setup the SCTE35 PID(s) use the following steps.

1. Start out at the home screen (where it shows the TS bit rate).
2. Press the ◁ button.
3. Use the △ and ▽ buttons to move the cursor to "SCTE35 Setup", then press the ENTER button.
4. Press the ENTER button again to get to the edit screen.



Setting Mode

1. Use the △ and ▽ buttons to move the cursor to "Mode", then press the ENTER button.
2. Use the △ and ▽ buttons to select the desired mode of operation ("Auto" or "Manual"), then press the ENTER button to save the selection.



Manual Mode

The following steps are only applicable to "Manual" mode.

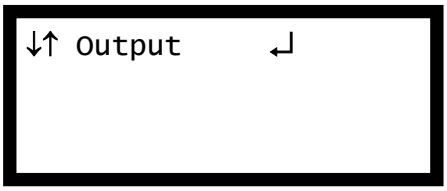
1. Use the △ and ▽ button to select “PID 1:” then press the ENTER button.
2. Use the ◁ and ▷ arrows to select the column to edit and use the △ and ▽ arrows to enter the PID, then press the ENTER button to save the selection.

Note: Use steps 1 and 2 above to enter the SCTE35 PIDs for fields “PID 2:” and PID 3:” if applicable.

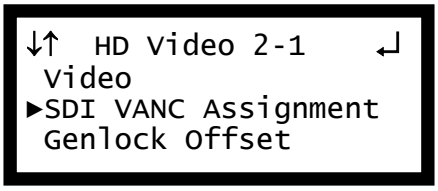
SCTE104 VANC Embedding

To setup the unit to embed the SCTE104 message into the SDI VANC use the following steps:

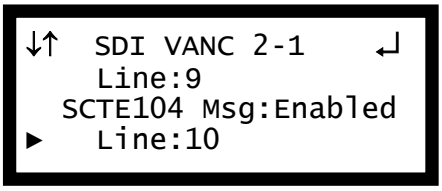
1. Press the OUTPUT button.
2. Use the △ and ▽ buttons to move the cursor to the HD Video selection, then press the ENTER button.



3. Use the △ and ▽ buttons to move the cursor to “SDI VANC Assignment”, then press the ENTER button.
4. Press the ENTER button again to display the edit menu.



5. Use the △ and ▽ buttons to move the cursor to “SCTE 104 Msg:”, then press the ENTER button.
6. Use the △ and ▽ buttons to choose “Enabled” or “Disabled”, then press the ENTER button to save the selection.
7. Use the △ and ▽ buttons to select “Line:” for SCTE104 Msg and press the ENTER button.
8. Use the △ and ▽ buttons to change the line number (4 – 15) in which the ancillary data will be located.

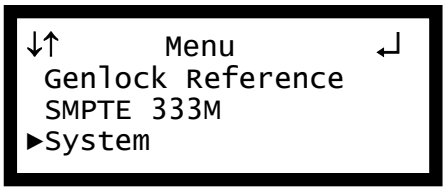


4.25 System Information

Description: The unit information for unit can be shown using the System menu. The system information contains the unit version, saving and loading of unit profiles (the configuration of the unit and its options), viewing the options that are installed in the unit, the unit temperature and the unit time.

The System information is accessed using the following steps:

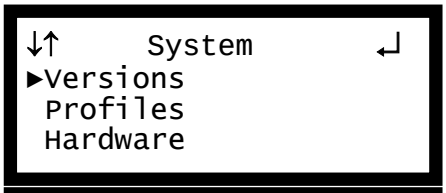
1. Press the MENU button.
2. Use the △ and ▽ button to move the cursor to “System” then press the ENTER button.

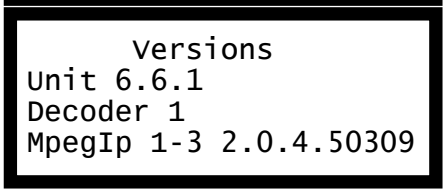


Versions

This displays the unit’s software version and the software versions of options that have versions enumerated separately from the unit’s version.

1. Use the △ and ▽ button to move the cursor to “Versions” then press the ENTER button.
2. The versions of the unit and its options are listed.

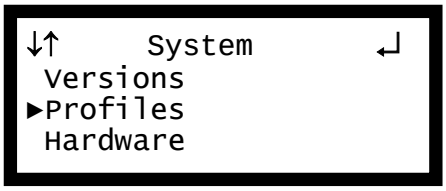




Profiles

This allows the user to save the configuration of the unit and its options. It also allows the user to load a previously saved profile or to delete a saved profile.

1. Use the △ and ▽ button to move the cursor to “Profiles” then press the ENTER button.



Saving a Profile

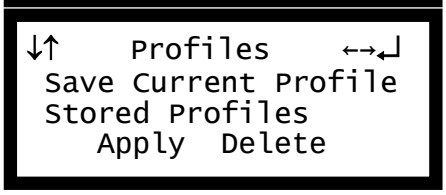
1. Use the △ and ▽ button to move the cursor to “Save Current Profile” then press the ENTER button.

2. Use the △ and ▽ buttons to change the character and then the ◁ and ▷ buttons to move to the next character.
3. Press the ENTER button when finished, to save the Profile.

Loading / Deleting a Stored Profile

1. Use the △ and ▽ button to move the cursor to the stored profile (“profile1” in the example) then press the ENTER button.

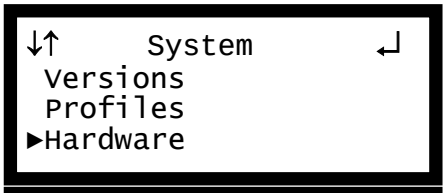
2. Use the ◁ and ▷ buttons to select “Apply” or “Delete”, then press the ENTER button.



Hardware

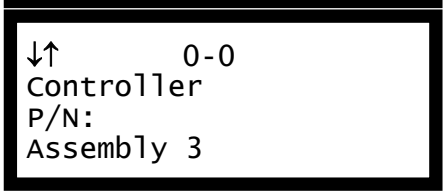
This lists the hardware of the unit and options that are installed along with the option slot. The indicated numbers follow the same rules as the active errors. See chapter 4.15 Active Errors

1. Use the △ and ▽ button to move the cursor to “Hardware” then press the ENTER button.



2. Use the △ and ▽ buttons to select a hardware unit and press the ENTER button to see details about the selected hardware.

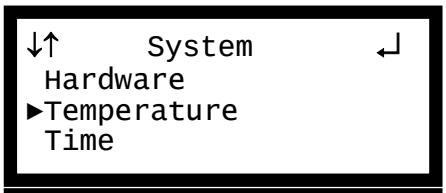
3. Use the △ and ▽ buttons to scroll up and down through the details. Press the EXIT button to return to the Hardware list.



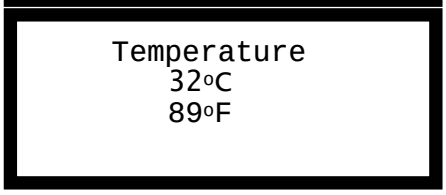
Temperature

This lists the temperature inside the unit unit in both ^{o}C and ^{o}F.

1. Use the △ and ▽ button to move the cursor to “Temperature” then press the ENTER button.



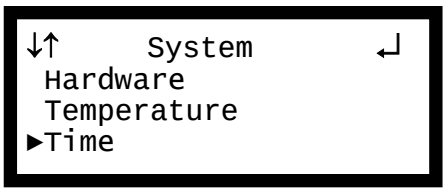
2. Press the EXIT button to return to the System menu.



Time

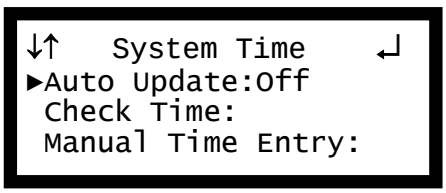
Allows setting and displaying to the unit’s clock.

1. Use the △ and ▽ button to move the cursor to “Time” then press the ENTER button.



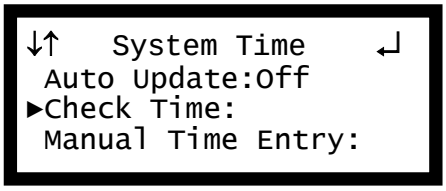
Set Auto Update

1. Use the △ and ▽ button to move the cursor to “Auto Update:” then press the ENTER button.
2. Use the △ and ▽ button to select “Off” or “On”, then press the ENTER button to save the selection.

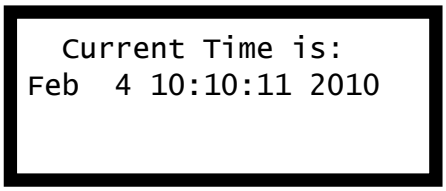


Display the Current Time

1. Use the △ and ▽ button to move the cursor to “Check Time:” then press the ENTER button.

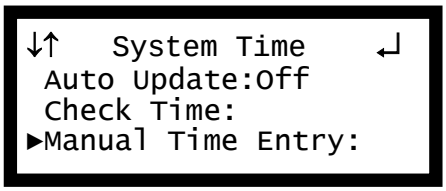


2. Press the EXIT button to return to the Time menu.

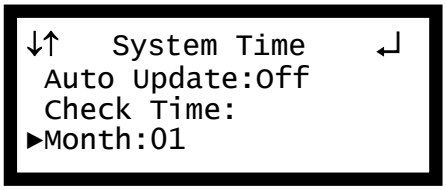


Manual Time Entry

1. Use the △ and ▽ button to move the cursor to "Manual Time Entry:" then press the ENTER button.



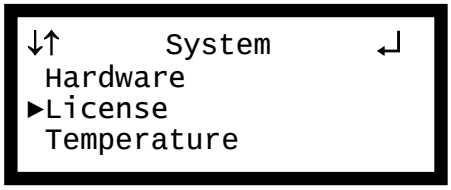
2. The following entries are shown for entry: "Month:", "Day:", "Year:", Hour:" and "Minute:".
3. For each entry, use the △ and ▽ buttons to change the character and then the ◁ and ▷ buttons to move to the next character.
4. Press the ENTER button to save the value and to move to the next entry.



4.26 Feature Licensing

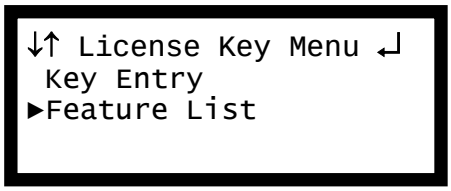
Feature Licensing provides enabling advanced capabilities of the unit options.

1. Click the MENU button.
2. Use the △ and ▽ buttons to select “System”, and then press the ENTER button.
3. Use the △ and ▽ buttons to select “License”, and then press the ENTER button.



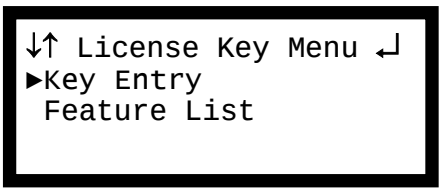
To View the Current Licensing

1. To view your current licenses select “Feature List”, and then press the ENTER button.

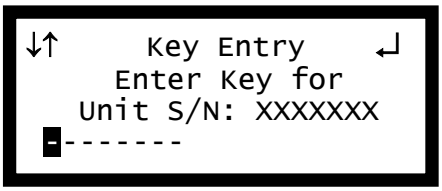


To Enter the License Key

1. To enter a new license key press the ENTER button when “Key Entry” is selected.



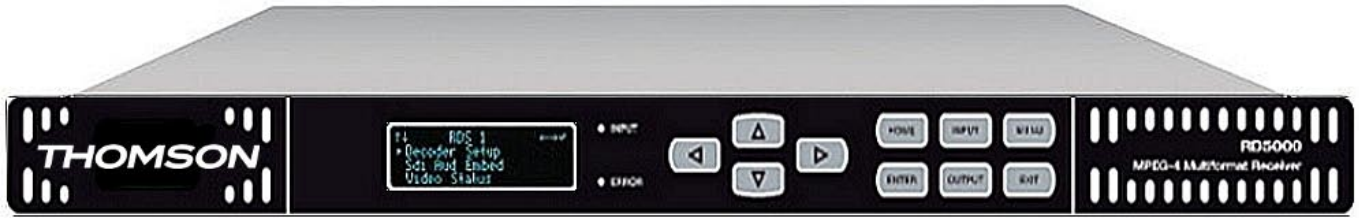
2. Use the △ and ▽ buttons to edit the character and use the ◁ and ▷ buttons to move to then next character. Press the ENTER button when finished.



Note: If you incorrectly enter the license key, you can go back and try again.

Note: A reboot will be required when the unit has finished saving the settings.

Section 5 – Using the Web Client to Configure the unit



Introduction

This section describes how to navigate through the configuration menus on the web client of the unit.

Note: All instructions in this manual are based on unit software 7.6.x. Newer versions of software, when released, may operate slightly different in regards to menus and configuration.

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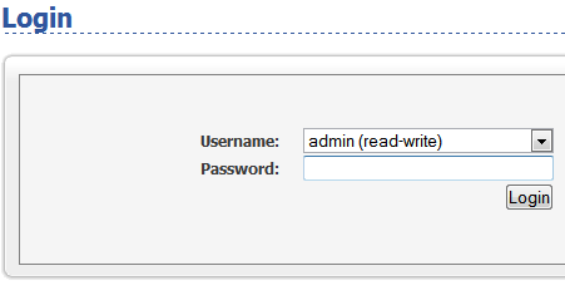
5.1 Login

To login to the remote web client for the unit, use the following steps:

1. Open an Internet Explorer browser window or a Firefox browser window, then type the IP address of the unit into the address box and press ENTER.

Note: The IP address of the unit can be found from the front panel "Network Setup" settings, see Section 4.17.

2. Select either the "admin (read-write)" or "user (read-only)" Username, and enter the associated password. Press the Login button to log into the unit.



Note: By default there is no password.

Note: If the password was changed (see Section 5.6) it can be recorded in the provided space below.

Password:_____

5.2 Status Indicators

Once logged into the web client, there are many things to take note of. The first things are the four status indicators along the top of the screen.

These indicators directly reflect the two status LEDs on the front panel. A green LED means the status of that object is good and a red LED means that status of that object is in error. If any of the indicators are red, a more detailed explanation is provided by clicking on the Unit tab and looking under the first section, "Error List."

Refer to Appendix B for a more detailed explanation of the individual errors.

5.3 Configuration

In a RD5002, RDS1 and RDS2 are differentiated in the first two tabs. To setup the Input, Services, and Output use the steps in the following sections.

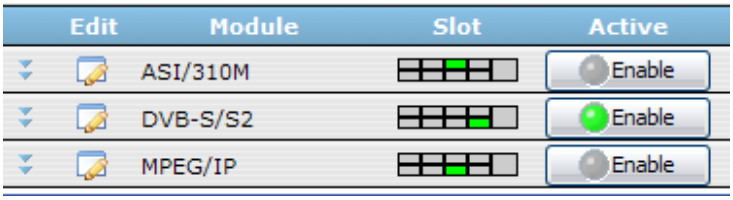
5.3.1 Input Setup

To set the desired input as active use the following steps:

1. Click on the RDS 1 or RDS 2 tab of the corresponding RDS that needs to be configured.

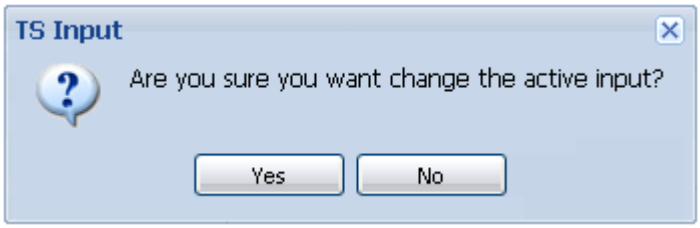
Note: In a single unit, there will only be a RDS 1 *tab.*

2. Click the Enable button on the same line as the input you wish to make active.

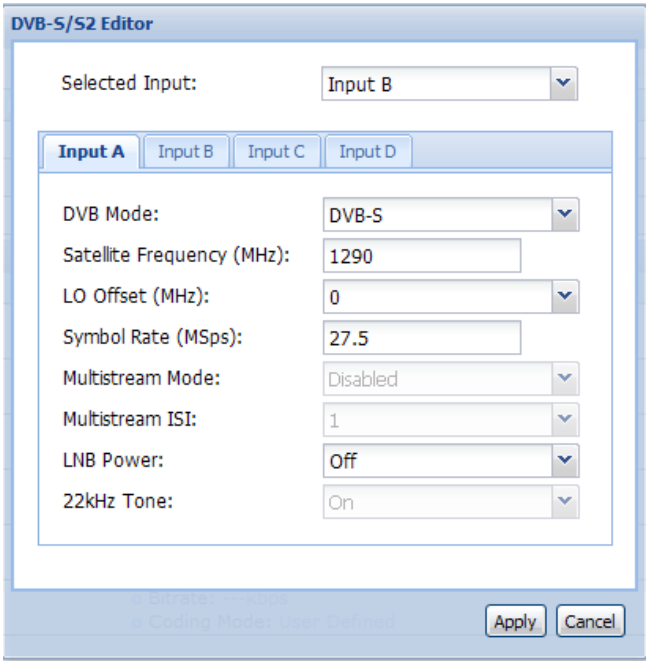


Note: The input is already active if the button looks like this: Enable

3. A dialog box will appear asking “Are you sure you want to change the active input?” Click Yes to approve the action.



4. Once the desired input had been set to active, the specific options of that input card can be set by clicking on the icon next to the active input. When the icon is clicked, an edit window will appear with the specific options for that card. Use the drop down menus and input boxes to complete the edit form. Click the Apply button at the bottom of the form to save the settings. The current settings for any of the input cards can be verified by clicking on the button next to the desired input.



5.3.2 Services Setup

After the desired input has been selected and configured, now the session needs to be setup.

All of the following options can be found under the “Services” heading.

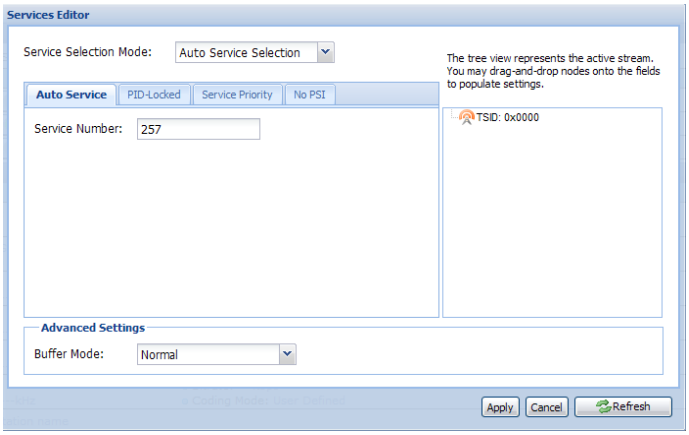
Services

The “Services” edit menu defines which program is going to be decoded. These can be setup in four different ways depending upon the application. The four different setup options are: “Auto”, “PID-Locked”, “Priority”, and “No PSI.” Auto mode should *only* be used if nothing is known about the PIDs in the TS. Priority mode is primarily used for redundancy. PID-Locked mode should *always* be used unless one of the above conditions is true. No PSI mode should only be used for streams that do not contain any PSI information. To setup these decoder settings use the following steps:

1. Click on the RDS 1 or RDS 2 tab of the corresponding RDS that needs to be configured.

Note: In a single unit, there will only be a RDS 1 *tab.*

2. Under the *"Services"* heading, click on the button next to *"Services."*
3. A new window should pop up in the middle of the screen. Use the drop down menu at the top to choose the appropriate setup type.
4. In the section on the right, there is a list of services detected in the stream and a ⊞ button to the left of each service.
5. Click the ⊞ button to view the contents of each service.
6. You can then drag and drop the PID values by simply clicking and holding them as you drag the PID value to the appropriate box in the section on the left.
7. Fill in the remaining input boxes then click the Apply button to save the settings.



Note: In PID-Locked mode, all of the entries should be entered as PIDs.

Note: In Auto mode, the program number should be entered as the number of the program in the TS.

Note: In Priority mode, the service number is entered and the audio entries should be entered as the number they are indexed by, in the TS.

Note: In No PSI mode, all of the entries should be entered as PIDs with their corresponding data type.

Note: Selecting a service (program) with drag and drop will also fill in the associated audio programs in the service entry fields.

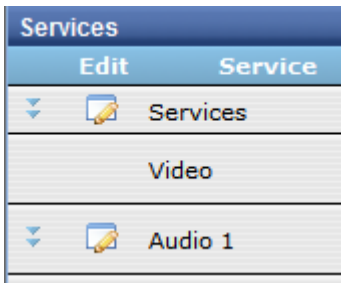
5.3.2.2 Audio Status and Downmix Settings

The audio downmix settings have three different configuration settings. These three are: transmission, monitor, and user. To configure the audio downmix setting, use the following steps:

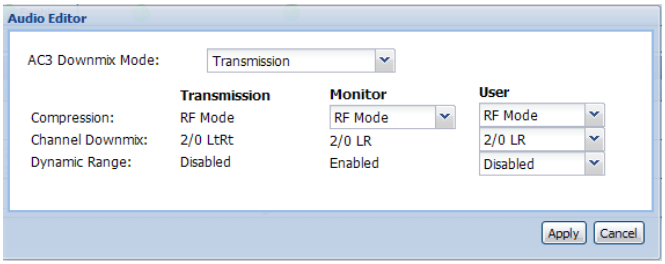
1. Click on the RDS 1 or RDS 2 tab of the corresponding RDS that needs to be configured.

Note: In a single unit, there will only be a RDS 1 *tab.*

2. Under the *"Services"* heading, click on the button next to the corresponding audio to configure.



3. A new window should pop up in the middle of the screen. Use the drop down menu at the top to choose the appropriate “AC3 Downmix Mode” .
4. Depending on the chosen Mode, use the remaining drop down menus to finish the setup.
5. Click the Apply button to save the settings.



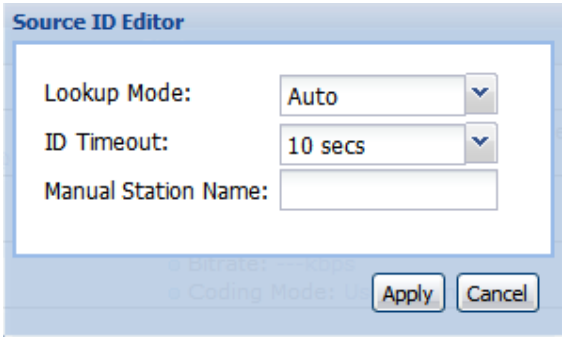
Note: Use the previous steps to setup the other audio dowmixes as well.

Note: “Transmission” Mode does not allow any changes. “Monitor” Mode allows changing the “Compression” value. “User” Mode allows changing “Compression”, “Channel Downmix” and “Dynamic Range” values.

5.3.2.3 Source ID

To setup the Source ID, use the following steps:

1. Click on the RDS 1 or RDS 2 tab of the corresponding RDS that needs to be configured.
2. Under the *“Services”* heading, click on the button next to the Source ID option.
3. A new window will pop up in the middle of the screen. Use the drop down menu at the top to choose the *“Lookup Mode.”*
4. Then use the next drop down box to choose the desired *“ID Timeout”* (in seconds).
5. Enter a *“Manual Station Name:”* and then click the Apply button to save the changes.

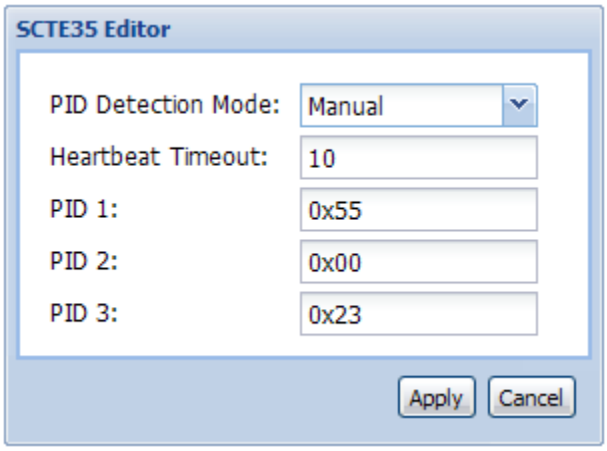


Note: If no source is found in the allotted time the “Manual Station Name:” is displayed.

5.3.2.4 SCTE 35 to SCTE 104 Setup

To select the PIDs for SCTE 35, follow the steps below.

1. Click on the RDS 1 or RDS 2 tab of the corresponding RDS that needs to be configured.
2. Under the *"Services"* heading, click on the button next to the "SCTE35" option.
3. Set the *"PID Detection Mode"* to either *"Auto, or Manual."*
4. Next, enter the *"Heartbeat Timeout:"* in minutes.
5. If *"Manual"* is selected in the above drop down box, *"PID 1, PID 2, and PID 3"* can be set as the PIDs that the unit will monitor for SCTE35 events.



Note: If "Manual" PID Detection Mode is selected the following boxes become available to configure: "PID 1, PID 2, and PID 3."

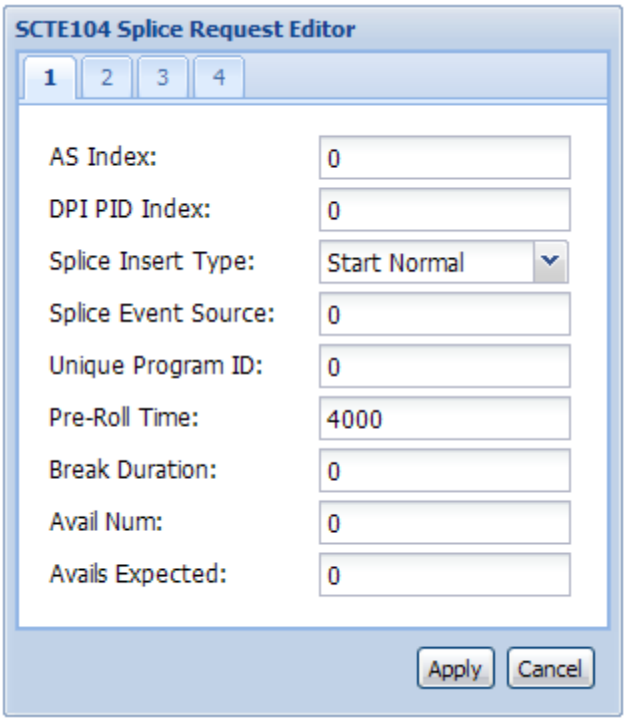
Note: If "Auto" mode is selected the unit will pick the first three DPI PIDs in the PMT's registration descriptor to monitor for SCTE35 events.

5.3.2.5 SCTE104 Splice Requests

To setup SCTE104 Splice Requests follow the steps below. The SCTE104 Splice Requests are available for the GPIO Module option (NRD00H10AA).

Note: Up to 4 SCTE104 Splice Requests can be set up at one time. Use the tabs at the top of the editor to configure a different Splice Request.

1. Click on the RDS 1 or RDS 2 tab of the corresponding RDS that needs to be configured.
2. Under the *"Services"* heading, click on the button next to the "*SCTE104 Splice Requests"* option.
3. Next, enter the *"AS Index"* if one is present, otherwise leave blank (0).
4. Enter the *"DPI PID Index"* to specify the index to the DPI PID that will carry the splice_info_sections.
5. Use the "Splice Insert Type:" drop down menu to select either *"Start Normal", "Start Immediate", "End Normal", "End Immediate", or "Cancel".*
6. Next is the "*Splice Event Source*". This is a user assigned value for the source of the cue message.
7. In the next *"Unique Program ID:"* box, enter the unique program ID.
8. In the box to the right of *"Pre-Roll Time"* enter the desired amount of time, in milliseconds, after being processed that the action will occur.
9. Then insert the *"Break Duration"* in tenths of seconds.
10. Next is the *"Avail Num"* which is a field that gives an authentication for a specific *avail* in the current *"Unique Program ID".*
11. Finally the *"Avails Expected"* box is the last parameter to configure. This box indicates the specific number of individual *Avails* expected within the current viewing event.



Note: The "AS Index" ranges from 0 to 255 and uniquely identifies the source of the message.

Note: The "DPI PID Index" ranges from 0 to 65535 and is important when there are multiple DPI PIDs referenced by the PMT of one MPEG program.

Note: The "Unique Program ID" ranges from 0 to 65535 and is a unique identification for a viewing event in the service.

Note: The "Break Duration" ranges from 0 65535. If the default, 0, is chosen the Injector will not set a duration. This value is ignored if "Splice Insert Type" is anything other than "Start Normal" or "Start Immediate."

Note: The "Avail Num" ranges from 0 to 255. If left at default, 0, non-usage will be assumed.

Note: The "Avails Expected" ranges from 0 to 255. If left at its default, 0, "Avail Num" is assumed to have no meaning.

Note: Using the front panel (see Section 4.7) uses the following names for the Splice Requests:

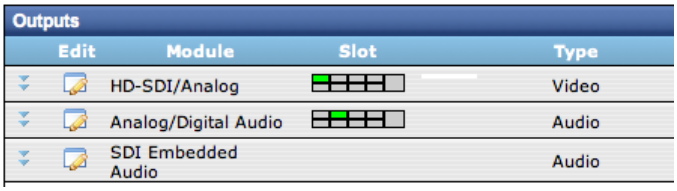
- *"Splice Event Source" for "Event Source"*

- *"Program ID" for "Unique Program ID"*
- *"Preroll" for "Pre-Roll Time"*
- *"Avail Expect" for "Avails Expected"*
- *"Splice Type" for "Splice Insert Type", with values:*
  - *"OON" for "Start Normal"*
  - *"OON Imm" for "Start Immediate"*
  - *"RTN" for "End Normal"*
  - *"RTN Imm" for "End Immediate"*

5.3.3 Output Setup

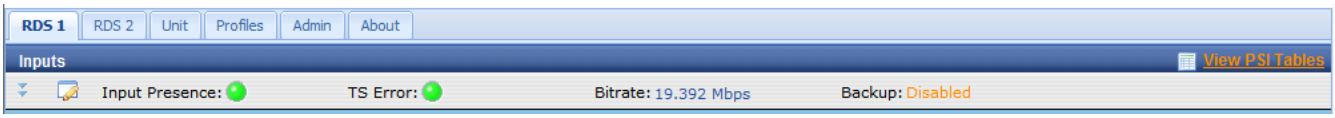
All of the installed output option cards are listed under the "Outputs" heading. This section includes the options for the installed output cards (e.g. Video, Audio).

Each output card can be configured by clicking on the button that is next to it. When the button is clicked it will bring up another window, in the middle of the screen, with the specific options for that card. Use the drop down menus and input boxes to complete the edit form. Click the Apply button, at the bottom of the form, to save the settings. The current settings for any of the output cards can be verified by clicking on the button next to the desired output.



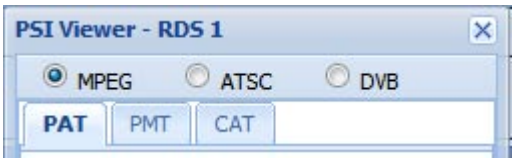
5.3.4 PSIP Information

To view the PSIP information for the applied TS, select the RDS (RDS 1 or RDS 2) and then click the View PSI Tables button which is located right next to the "Inputs" heading towards the top of the page.

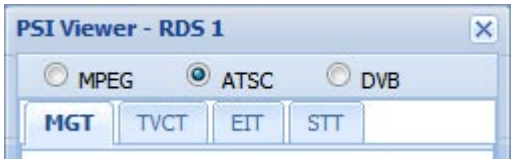


This will open a new window that displays all of the PSIP information for the applied TS. The PSIP Tables are grouped into "MPEG", "ATSC" and "DVB" tables. The table groups are selected using the selection radial buttons MPEG, ATSC or DVB.

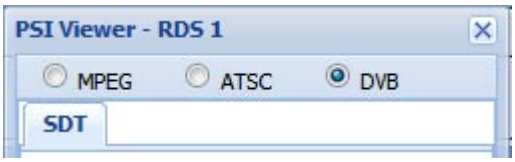
The MPEG table grouping includes displaying the PAT, PMT or CAT. Click the tabs at the top of the window to view the corresponding table.



The ATSC table grouping includes displaying the MGT, TVCT, EIT or STT. Click the tabs at the top of the window to view the corresponding table.



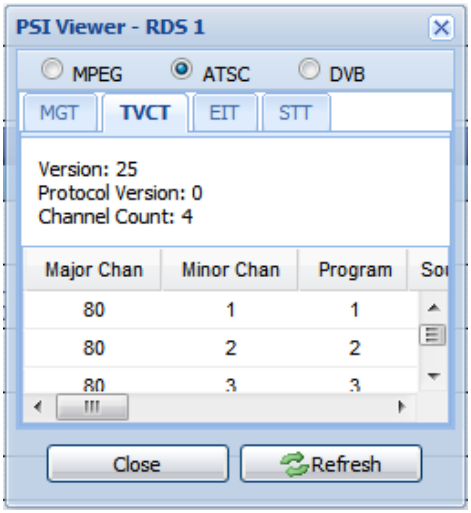
The DVB table grouping displays the SDT.



The PSIP Table display window can be resized to fit the table being displayed. Scroll bars allow displaying the parts of the table that do not fit in the window.

The displayed table is not automatically updated if the content changes. Use the Refresh button to update the table display. Changing tables will also display the current table information.

In order to close the PSIP table display window, use the Close or button.

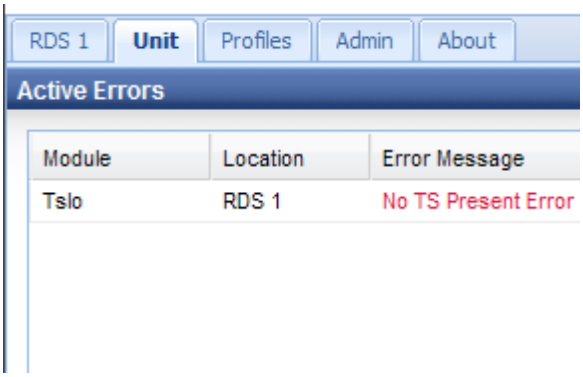


5.4 Unit

This section will describe what information is included under the Unit tab.

5.4.1 Active Errors

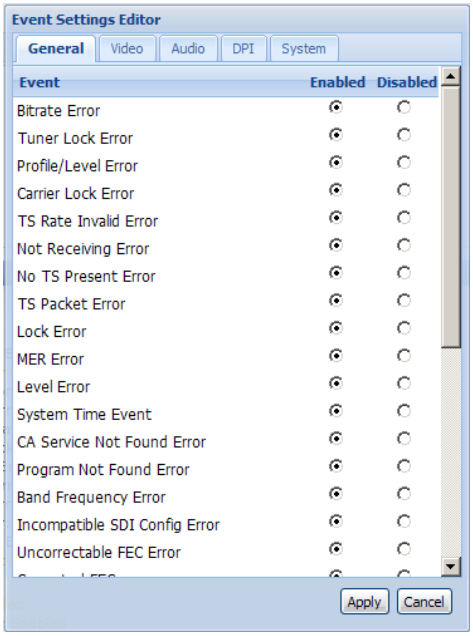
The first thing under this tab is the “Active Errors.” If any of the status indicators across the top of the web client are indicating an error (i.e. red circle) this section will give a more detailed description of the specific error along with the location of the item that is producing the error.



5.4.2 Event Logging

Just below the “Active Errors” is the “Event Logging” section. This section shows all the possible events that the unit will log. Follow the steps below to either enable or disable an event.

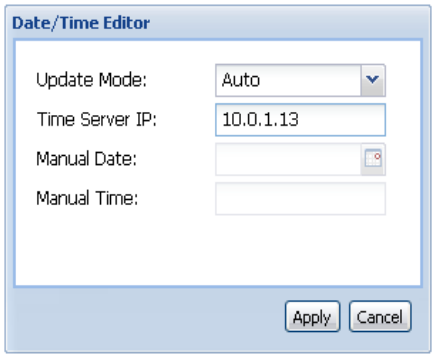
1. Click the button under the “Event Logging” heading. This will bring up a new edit form in the middle of the screen.
2. Choose either the “General, Video, Audio, DPI, or System” tab to enable or disable events under those headings.
3. Then click the Apply button, at the bottom of the form, to save the settings.

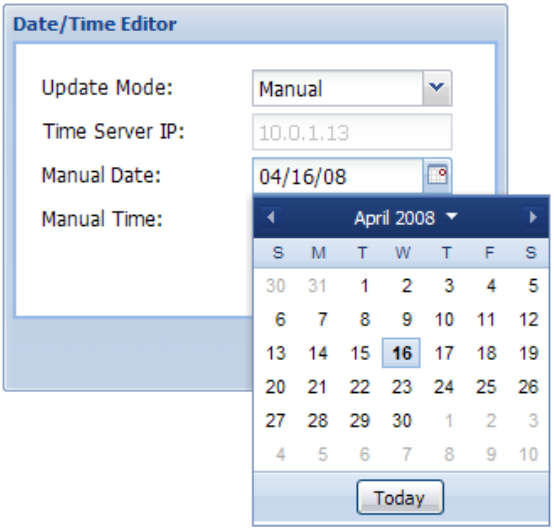


5.4.3 Unit Date/Time

The next section is the “Unit Date/Time” section. This section gives an overview of how to configure the date and time of the unit.

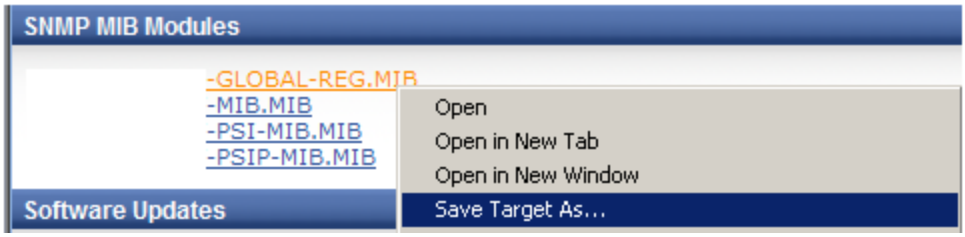
1. Click the button under the “Unit Date/Time” heading. This will bring up a new edit form in the middle of the screen.
2. Use the drop down menu to select either “Auto, or Manual.”
3. If “Auto” is selected, the option to use a time server is available. Enter the IP address of the Time Server in the space provided.
4. Then click the Apply button to save the changes.
5. If “Manual” is selected, click the button to choose the date.
6. Then enter the time manually in the space provided.
7. Click the Apply button to save the changes.





5.4.4 SNMP MIB Modules

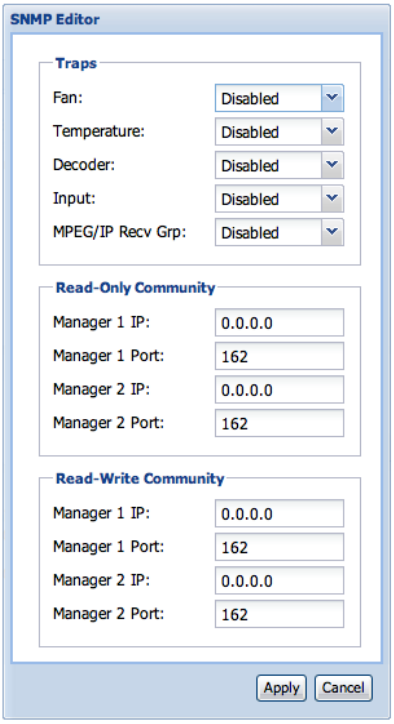
In order to control the unit using SNMP, the MIB modules need to be downloaded. The THOMSON specific MIB modules are displayed under the “Admin/SNMP MIB Modules” heading. The generic MIB modules can be viewed and downloaded by clicking on the “View All MIB Modules…” hyperlink. That will bring up a new window displaying all the generic MIB modules. To download these, right-click on the desired MIB module under the “SNMP MIB Modules” heading and select “Save Target As…”



5.4.5 SNMP Settings

The next section is the SNMP settings. This section gives an overview of all the SNMP settings as well as the configuration of SNMP. To edit the SNMP settings use the following steps:

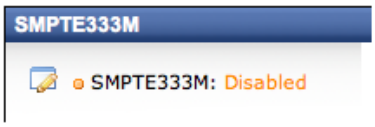
1. Click the button under the “SNMP Settings” heading. This will bring up a new edit form in the middle of the screen.
2. Use the drop down menus and input boxes to configure SNMP to the desired settings.
3. At the top of the edit form there are five drop down menus for enabling or disabling five separate SNMP traps as well.
4. When all of the settings have been configured, click the Apply button, at the bottom of the form, to save the settings.



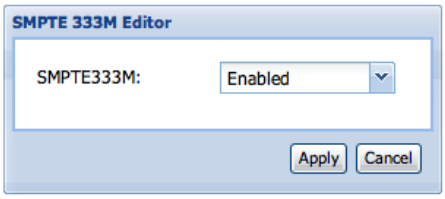
5.4.6 SMPTE333M

To enable SMPTE333M, use the following steps:

1. Click the button next to the SMPTE333M title. This will bring up a new edit form in the middle of the screen.



2. Use the drop down menu to enable or disable SMPTE333M.
3. Click the Apply button, at the bottom of the form, to save the settings.

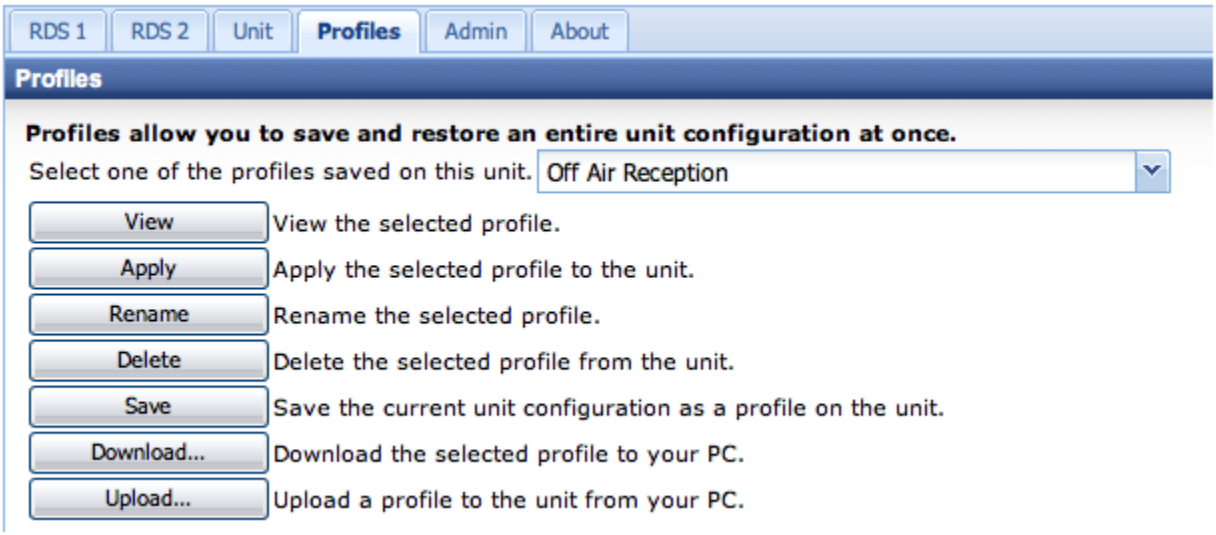


5.5 Profiles

Profiles are the means for saving and applying a group of settings on an unit for a particular use. By applying a particular profile, the user can recall the settings of the unit for different demodulation and decoding needs.

Up to 24 different profiles can be stored on an unit. New profiles can be added to the unit by configuring the various settings of the unit, then “saving” this profile and giving it a name. New profiles can also be added to an

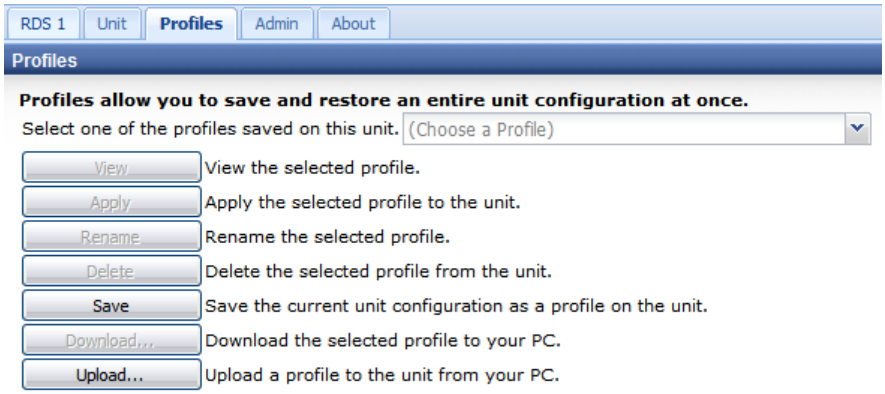
unit by transferring them from a PC via the web client interface. Profiles can be deleted, by name, to make room for others. To configure profiles, first click on the Admin tab to display the profiles section.



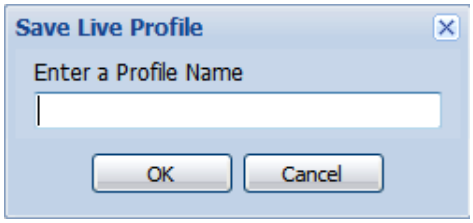
5.5.1 Saving a Profile

Once the unit is configured as required for a specific use and environment, the settings can be saved to the unit by a named profile. To save a profile, use the following steps:

1. Click the Save button.



2. Enter a name for the profile.
3. Click the OK button to save the profile.
4. Click the Close button after the profile has been successfully saved.

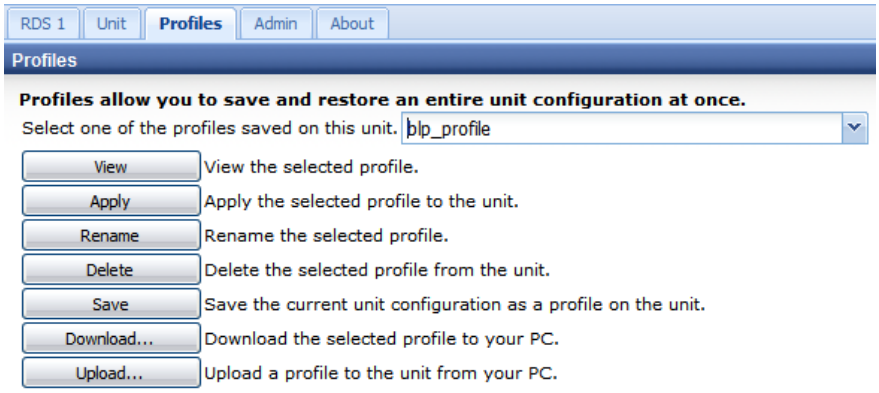


Note: The profile name should be no more than 15 characters long.

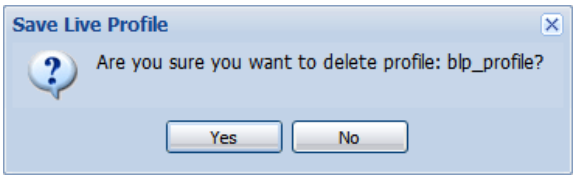
5.5.2 Deleting a Profile

If a given profile is no longer needed or more space is needed on the unit for more profiles, it may be necessary to delete a profile. To delete a profile, use the following steps:

1. Use the drop down menu to select the profile to be deleted.
2. Click the Delete button.



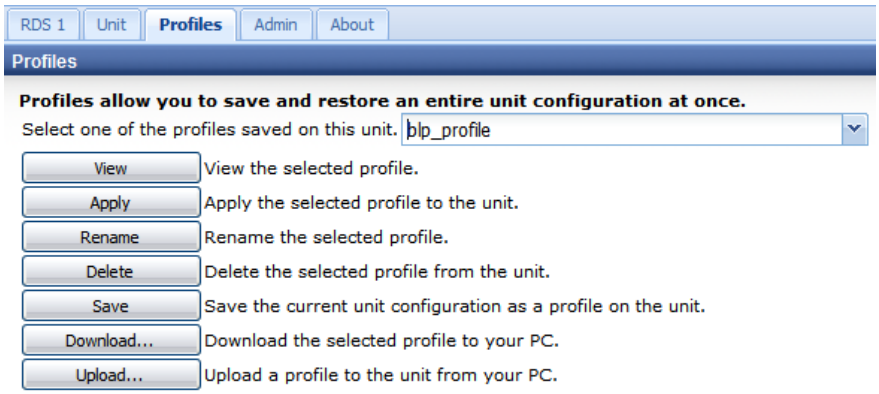
3. A dialog box will appear and ask, “Are you sure you want to delete this profile?” Be sure to check the profile name in the dropdown box because that is the profile that will be deleted.
4. Click the Yes button in the dialog box to confirm the delete.
5. After the profile has been deleted, click the Close button to close the dialog box.



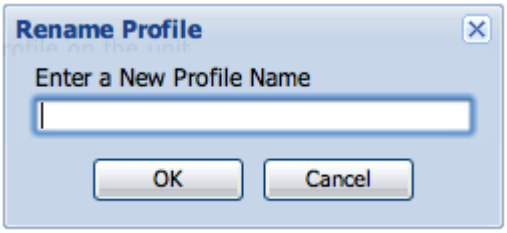
5.5.3 Renaming a Profile

If a particular profile’s name needs to be changed for one reason or another, use the following steps to change the name of the profile:

1. Use the drop down menu to select the profile to be renamed.
2. Click the Rename button.



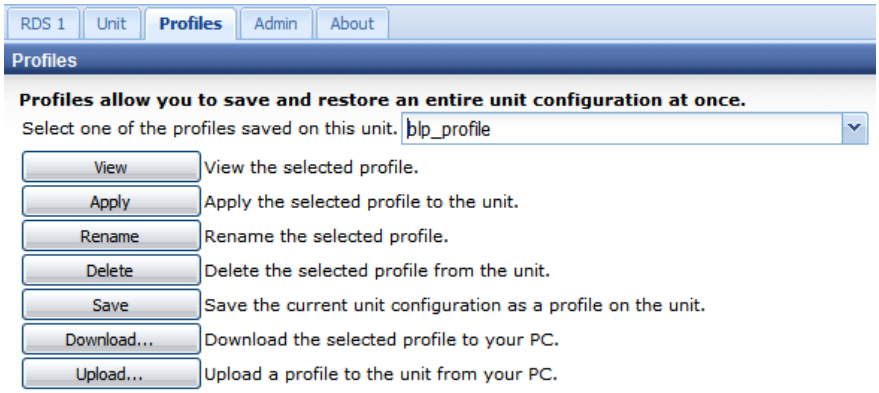
3. A dialog box will appear that has the current name of the profile in it. Type a new name for the profile in the input box.
4. Click the OK button in the dialog box to confirm the rename.
5. After the profile has been renamed, click the Close button to close the dialog box.



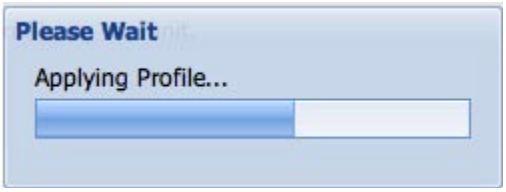
5.5.4 Applying a Saved Profile

Once one or more profiles have been saved in the unit it is possible to apply any of the saved profiles. When the selected profile is applied, the settings that were saved in that profile will now be applied. To apply a saved profile, use the following steps:

1. Choose the desired profile from the drop down menu.
2. Click the Apply button.



3. It may take up to a minute to apply the new profile. When the profile has been successfully loaded click the Close button to close the dialog box.



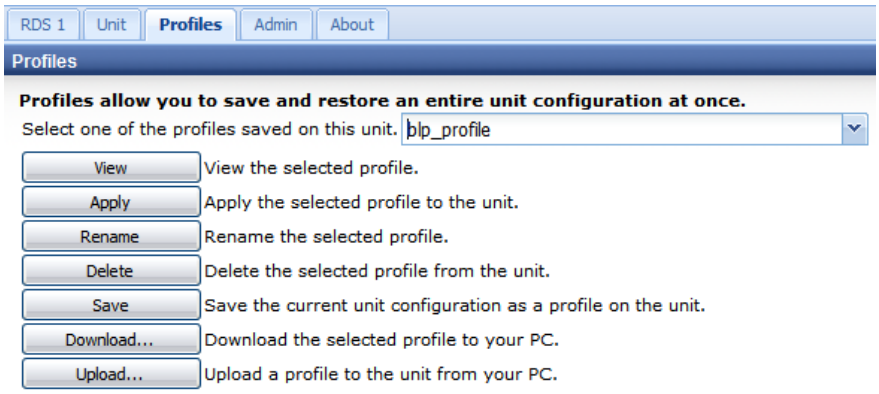
5.5.5 Viewing a Saved Profile

To view the settings contained in a saved profile choose the desired profile from the drop down list then click the View button. A new window will appear with all of the settings contained in that profile.

5.5.6 Downloading a Saved Profile

The unit is capable of downloading a saved profile to a local computer. This option can be extremely useful if more than 24 profiles are needed. Since only 24 profiles can be stored on the unit, new profiles can be created on the unit and then downloaded to the local computer. To download a profile from the unit, use the following steps:

1. Choose the desired profile from the drop down menu.
2. Click the Download... button.



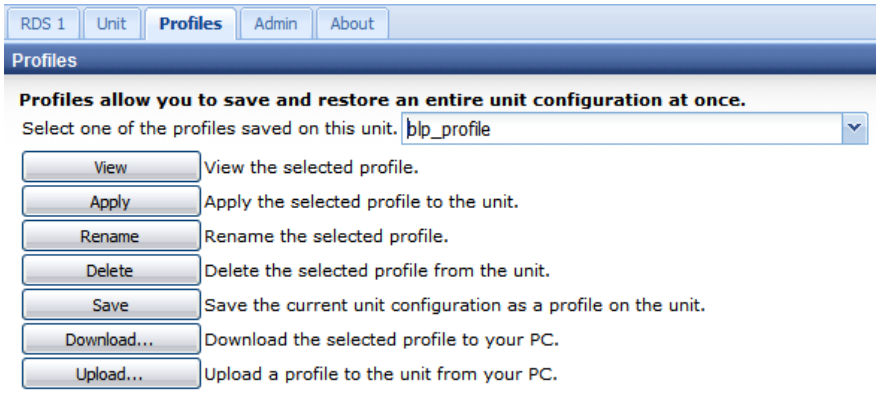
3. A new dialog box will appear and ask what to do with the file. Click the Save button and then point to a location on the local computer.
4. Click the Save button again.

File Download
Do you want to open or save this file?
Name: profile.xml
Type: XML Document
From: 10.0.7.20
Open
Save
Cancel
While files from the Internet can be useful, some files can potentially harm your computer. If you do not trust the source, do not open or save this file. What's the risk?

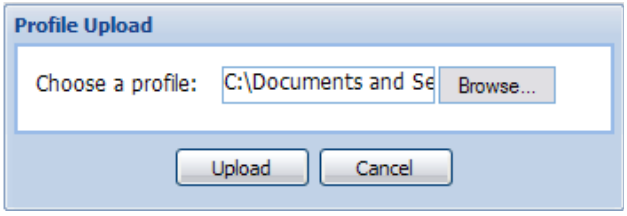
5.5.7 Uploading a Saved Profile

When a saved profile on a local computer is needed, it is necessary to upload that profile back to the unit. To upload a profile, from a local computer, back to the unit, use the following steps:

1. Click the Upload... button.



2. A new window will appear with a space to provide the path of the profile to upload. Click the Browse... button and navigate to the location of the profile on the local computer. Select the file and then click Open.
3. The file path box should now be filled in with the location of the profile. Click the Upload button.

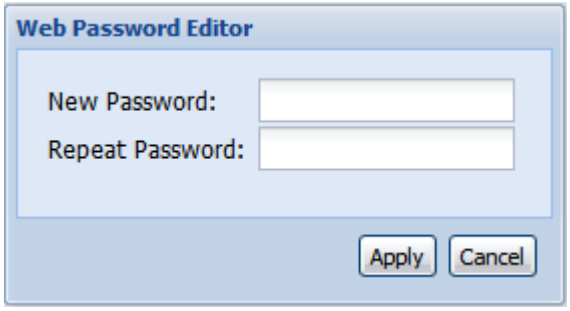


5.6 Web Passwords

The password on the web client for the admin account and user account should be changed to something other than the default passwords. The process is the same for both the admin account and the user account, just click on the button next to the account of the password to change. To change either the admin account password or the user account password, use the following steps:

1. Click on the button next to the account to edit.

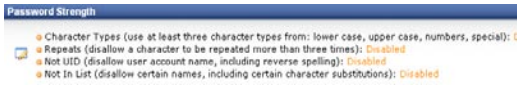
2. A new window will appear in the middle of the screen. Type the new password in both of the fields and then click the Apply button to save the new password.



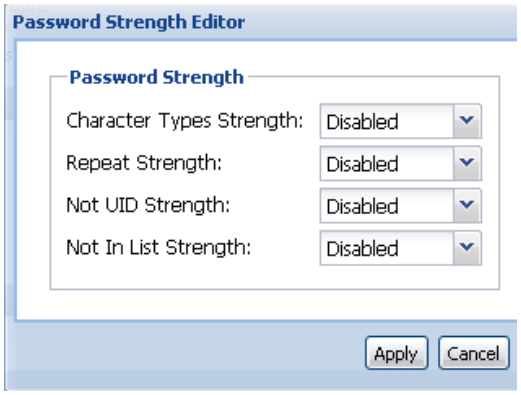
5.7 Password Strenght

If desired, the password strength for the web client can be increased from the default value. To change the password strength required, click on the button in the Password Strength Section. To change any of the password strength settings:

1. Click on the button in the Password Strength Section to edit.



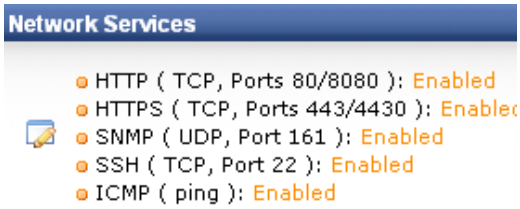
2. A new window will appear in the middle of the screen. Change the settings desired and then click the Apply button to save the settings.



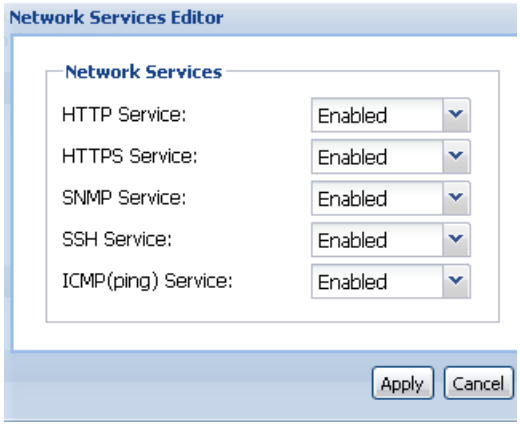
5.8 Network Services

If desired, the Network Secrity can be increased from the default value by disabling any or all of the Network Services. To change any of the network services, click on the button in the Network Services Section. To change any of the network service settings:

1. Click on the button in the Network Services section to edit.


Network Services
HTTP (TCP, Ports 80/8080): Enabled
HTTPS (TCP, Ports 443/4430): Enable
SNMP (UDP, Port 161): Enabled
SSH (TCP, Port 22): Enabled
ICMP (ping): Enabled

2. A new window will appear in the middle of the screen. Change the settings desired and then click the Apply button to save the settings.

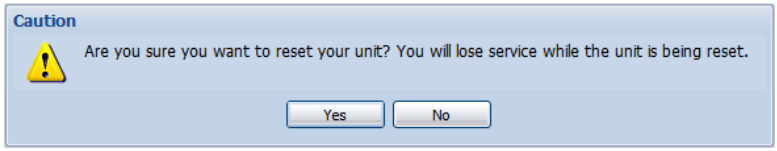


5.9 Reset Unit

If a problem should ever arise where the unit has locked up, or malfunctioned in some manner, it is possible to perform a soft reset from the web client. A soft reset will reboot the unit and hopefully take care of any previous problems the unit was exhibiting. A soft reset will not change any setting. To perform a soft reset, use the following steps:

1. Click the “Reset Unit” hyperlink under the “Reset Unit” heading.

2. A new dialog box will appear asking “Are you sure that you want to reset the unit?” Click the Yes button to reset the unit.



Caution: Resetting the unit is a service affecting event and service will be interrupted while the unit is rebooting.

3. A progress bar will appear on the screen as the unit is resetting. It may take up to 5 minutes for the unit to restart depending on the configuration.

4. Once the unit has restarted the web client will be redirected back to the login page for the unit.

5.10 Software Updates

Occasionally THOMSON will release new software for the unit to provide new features and bug fixes. **NEVER PERFORM A SOFTWARE UPDATE UNLESS INSTRUCTED TO DO SO BY A THOMSON REPRESENTATIVE.** If an update is warranted, the representative will provide the software and instructions for the update.

5.11 Diagnostics

5.11.1 Processes

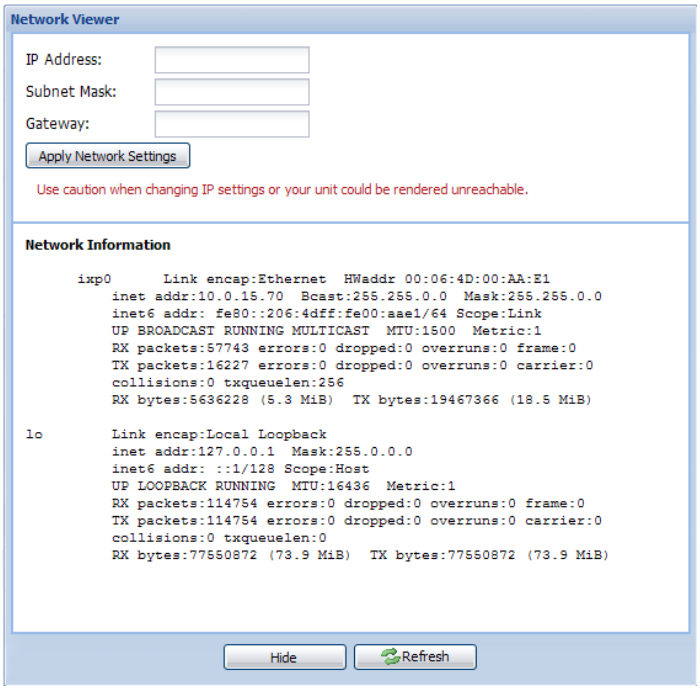
This section is primarily used THOMSON representative to aid in troubleshooting a problem. By clicking on the "View Processes Window…" hyperlink, under the "Diagnostics" heading, it will bring up a new window that shows all the running processes of the unit's operating system. *There are no user-definable parameters under this menu.*

5.11.2 Network Interface Information

This section displays detailed information about the network portion of the unit. It also allows a new IP address to be set in the unit. To set a new IP address, use the following steps:

⚠ ***Warning: Use caution when changing IP settings or the unit may be rendered unreachable.***

1. Click the "View Network Interface Window…" hyperlink, under the "Diagnostics" heading.
2. A new window will appear in the middle of the screen. This new windows will give all of the details for the network interface of the unit, as well as contain three input boxes to set a new IP address.
3. Fill in the three fields, "IP Address", "Subnet Mask", and "Gateway."
4. Click the Apply Network Settings button to save the network settings.


Network Viewer
IP Address:
Subnet Mask:
Gateway:
Apply Network Settings
Use caution when changing IP settings or your unit could be rendered unreachable.
Network Information
ixp0 Link encap:Ethernet HWaddr 00:06:4D:00:AA:E1
inet addr:10.0.15.70 Bcast:255.255.0.0 Mask:255.255.0.0
inet6 addr: fe80::206:4dff:fe00:aae1/64 Scope:Link
UP BROADCAST RUNNING MULTICAST MTU:1500 Metric:1
RX packets:57743 errors:0 dropped:0 overruns:0 frame:0
TX packets:16227 errors:0 dropped:0 overruns:0 carrier:0
collisions:0 txqueuelen:256
RX bytes:5636228 (5.3 MiB) TX bytes:19467366 (18.5 MiB)
lo Link encap:Local Loopback
inet addr:127.0.0.1 Mask:255.0.0.0
inet6 addr: ::1/128 Scope:Host
UP LOOPBACK RUNNING MTU:16436 Metric:1
RX packets:114754 errors:0 dropped:0 overruns:0 frame:0
TX packets:114754 errors:0 dropped:0 overruns:0 carrier:0
collisions:0 txqueuelen:0
RX bytes:77550872 (73.9 MiB) TX bytes:77550872 (73.9 MiB)
Hide
Refresh

5.12 About

Under the About tab, there are no user definable parameters but there is information about how to contact THOMSON, as well as information about the software versions on the unit, and which option cards are installed.

5.13 Feature Licensing

The Web Client is the easiest way to upgrade the licensing on the unit. The following licenses are available for the options (if restricted to only certain installed options):

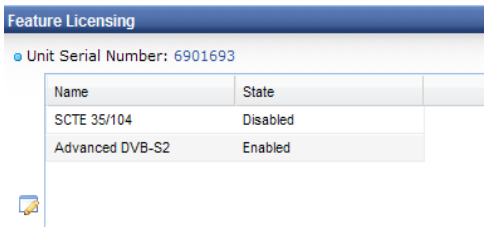
- "SCTE 35/104" – conversion of SCTE35 to SCTE 104 VANC packets – NRD00S01AA
- "Advanced Satellite Features" – allows multistream, VCM, 16APSK and 32APSK – NRD00S02AA

Simply login to the unit Remote Web Client as an administrator, and then click the Admin tab. The first section under this tab is "Feature Licensing". The unit's options determine the licenses that are applicable to the unit, in the example "Advanced DVB-S2" is listed as well as "SCTE35/104" each followed by either "Enabled" or "Disabled". If all listed features are "Enabled" then you do not need to upgrade the licensing.

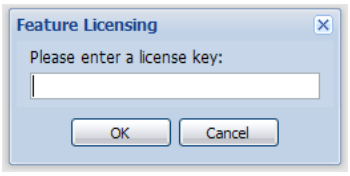
When a license is upgraded, the entire unit and all of the options that support the licensed features can now support the additional feature capabilities.

Follow these steps to upgrade

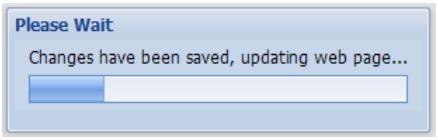
1. Click on the button on the left under "Feature Licensing".



2. Enter your newly acquired license key in the space provided, and then press the OK button.



3. When the unit is finished saving the settings a reboot will be required.



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Section 6 – Appendices

Introduction

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.

Appendix A – Acronyms and Glossary

8VSB: Vestigial sideband modulation with 8 discrete amplitude levels.
16VSB: Vestigial sideband modulation with 16 discrete amplitude levels.
AC-3: Also known as Dolby Digital
AAC: Advanced Audio Coding
AES: Audio Engineering Society
ASI: Asynchronous Serial Interface
ATSC: Advanced Television Systems Committee
AV: Audio Video
Bit Rate: The rate at which the compressed bit stream is delivered from the channel to the input of a decoder.
BNC: British Naval Connector
BPS: Bits per second.
CAT: Conditional Access Table
CAT6: Category 6 – Cable standard for gigabit Ethernet
CC: Closed Caption
CoP: Code of Practice
CRC: Cyclic Redundancy Check
CVCT: Cable Virtual Channel Table
DHCP: Dynamic Host Configuration Protocol
DTVCC: Digital Television Closed Captioning
DVB: Digital Video Broadcasting
EBU: European Broadcasting Union
EIA: Electronic Industries Alliance
EIT: Event Information Table
EPG: Electronic Program Guide
ETM: Extended Text Message
ETT: Extended Text Table
Event: An event is defined as a collection of elementary streams with a common time base, an associated start time, and an associated end time.
FCC: Federal Communications Commission
FEC: Forward Error Correction
Field: For an interlaced video signal, a “field” is the assembly of alternate lines of a frame. Therefore, an interlaced frame is composed of two fields, a top field and a bottom field.
Frame: A frame contains lines of spatial information of a video signal. For progressive video, these lines contain samples starting from one time instant and continuing through successive lines to the bottom of the frame. For interlaced video a frame consists of two fields, a top field and a bottom field. One of these fields will commence one field later than the other.
HANC: Horizontal Ancillary
HD: High Definition
High level: A range of allowed picture parameters defined by the MPEG-2 video coding specification which corresponds to high definition television.
I/O: Input/Output
IP: Internet Protocol
LED: Light Emitting Diode
LNB: Low-Noise Block
MAC: Medium Access Control

Main level: A range of allowed picture parameters defined by the MPEG-2 video coding specification with maximum resolution equivalent to ITU-R Recommendation 601.
Main profile: A subset of the syntax of the MPEG-2 video coding specification that is expected to be supported over a large range of applications.
Mbps: 1,000,000 bits per second.
MER: Modulation Error Ratio
MGT: Master Guide Table
MIB: Management Information Base
MP@HL: Main profile at high level.
MP@ML: Main profile at main level.
MPEG: Refers to standards developed by the ISO/IEC JTC1/SC29 WG11, *Moving Picture Experts Group.* MPEG may also refer to the Group.
MPEG-2: Refers to ISO/IEC standards 13818-1 (Systems), 13818-2 (Video), 13818-3 (Audio), 13818-4
MPTS: Multiprogram Transport Stream
NTSC: National Television System Committee
OSD: On Screen Display
PAL: Phase-Alternating Line
PAT: Program Association Table
PCM: Pulse-Code Modulation
PCR: Program Clock Reference
PID: Packet Identifier. A unique integer value used to associate elementary streams of a program in a single or multi-program transport stream.
PMT: Program Map Table
Profile: A defined subset of the syntax specified in the MPEG-2 video coding specification
Program specific information (PSI): PSI consists of normative data which is necessary for the demultiplexing of transport streams and the successful regeneration of programs.
Program: A program is a collection of program elements. Program elements may be elementary streams. Program elements need not have any defined time base; those that do have a common time base and are intended for synchronized presentation.
PTS: Presentation Time Stamp
QAM: Quadrature Amplitude Modulation
QPSK: Quadrature Phase-Shift Keying
RDS: Receiver Decoder System
RF: Radio Frequency
RGBHV: Red, Green, Blue, Horizontal, Vertical
RO: Read Only
RPM: Revolutions Per Minute
RRT: Rating Region Table
RS-232: Recommended Standard. A standard for serial binary data interconnection.
RU: Rack Unit
RW: Read/Write
SD: Standard Definition
SDI: Serial Digital Interface
SFP: Small Form-Factor Pluggable

SI: System Information
SMPTE: Society of Motion Pictures and Television Engineers
SNMP: Simple Network Management Protocol
SSRC: Synchronization Source
STD input buffer: A first-in, first-out buffer at the input of a system target decoder for storage of compressed data from elementary streams before decoding.
STD: System Target Decoder. A hypothetical reference model of a decoding process used to describe the semantics of the Digital Television Standard multiplexed bit stream.
STT: System Time Table
TS: Transport Stream
TVCT: Terrestrial Virtual Channel Table
UTC: Coordinated Universal Time
VANC: Vertical Ancillary
VCT: Virtual Channel Table. Used in reference to either TVCT or CVCT.
XLR: Cannon “X” series connector, with a Latch, and Rubber around the contacts.
YPbPr: Component Red, Green, Blue

Appendix B – Error/Event List

General

- **Bitrate Error -** The TS bitrate is not within 100 bps of 19.392 Mbps while using the 310M card, or it is greater than 160 Mbps while using ASI.
- **Tuner Lock Error** – The FEC is not synchronized. Data on carrier is not synchronized.
- **Video Unsupported Profile/Level** - The video is not of a supported profile/level.
- **Carrier Lock Error** - Cannot detect the carrier signal.
- **TS Rate Invalid -** A burst of packets caused the receive FIFO to overflow.
- **Not Receiving Packets** - The card is not receiving IP packets within 1 FEC period (1 second).
- **No TS Present Error** - There is no sync byte (0x47) found in a 1 second period.
- **Transport Packet Error** - There was an error in the transport stream.
- **Lock Error** - A carrier cannot be found.
- **Low MER** - The MER is lower than the threshold set by the user.
- **Low Level** - The signal level is lower than the threshold set by the user.
- **System Time Event –** If the unit is powered on/off, the time is manually updated, or the time server is invalid, this event will be triggered.
- **CA Service Not Found-** The CAM is configured to use selected PIDs, but the selected PID is no longer available in the PMT.
- **Program Not Found** – The Program / Service that is selected is not available.
- **Band Frequency Error** – The Satellite Receiver tuning using Frequency and Offset is not within the Receiver's tuning range.
- **FP Login Error Event** – There was an attempt to unlock that front panel using the wrong password.
- **All SDI Jacks Squelched Error** –
- **Uncorrectable FEC Error Event** – There was an FEC error that was uncorrectable.
- **Corrected FEC Error Event** – There was an FEC error that was corrected.
- **Out of Order Packet Error Event** – The IP connection has received an out of order packet that is not able to be restored to its correct order.
- **Duplicate Packet Error** – The IP connection has received a duplicate packet that was disgarded.
- **Not Receiving IP Packets Error** – An incoming IP connection is no longer receiving any packets.
- **IP TS Sync Loss Error** – An incoming IP connection has lost its TS synchronization, it could still be receiving packets.
- **DMIP Failover Backup Error** – The NRD00H05AA (MPEG over IP Input/Output card) IP backup IP Receive Group is now being used as the Active Receive Group.
- **DMIP Temperature Error** – The NRD00H05AA (MPEG over IP Input/Output card) has exceeded its normal operating temperature limit.
- **Input Switched to Backup Error** – The Backup input option has replaced the Primary input option as the active input.
- **Line Conflict** – An SDI output VANC line has a conflicting data trying to be placed on the same line.
- **FEC Error Counter Rollover Event** – The FEC error counter has restarted at 0.
- **FEC Error Counter Reset Event** – There has been an FEC counter reset, setting all of the FEC counters for the input option to 0.
- **AFD Code Not Present Event** – The unit is configured to use or embed the AFD code in the VANC, and the AFD code is not present with the input video.

Video

- **Video Not Decoding Error –** The decoder didn't receive a new video frame within 3 seconds.
- **Video Type Error-** Selected video stream format is not supported by the decoder.
- **Video Unknown Error** – Video Decoder does not recognize the video stream.
- **Video Conversion Error-** The video stream cannot be converted.
- **Invalid Output Format Error** - The output format selected is invalid for the combination of incoming stream and output card.
- **Incompatible Genlock Error** - The Genlock Reference selected by the user is incompatible with the incoming stream format.
- **Genlock Reference Error** - The Genlock reference is set but there is no reference signal detected.
- **SD Down-Conversion Error** – The conversion to an SD output format from HD failed because the HD frame rate is not 29.97 (for NTSC) or 25 / 50 (for PAL).
- **4:2:2 Conversion Error** – Generated when chroma format is 4:2:2 and the native resolution is 1080 and the output is 720, video scaling is not possible.
- **Video No Sync Error** – The video synchronization is not taking place due to the large difference between the PTS and PCR (> 6 seconds).

Audio

- **DolbyE Not Decoding Error** - The DolbyE PID has been set but is not being decoded.
- **Audio (N) Not Decoding Error** - Audio Decoder (N) didn't receive a new audio frame within 3 seconds.
- **Audio (N) Unknown Error** - Audio Decoder (N) does not recognize the audio stream.

System

- **Fan Error** - The fan is spinning at less than 500 RPM.
- **Temperature Error** - The internal temperature has exceeded 70 Celsius.
- **DPI Stream Type Locked Error-** User is not licensed to decode the selected stream.

DPI

- **SCTE104 GPI Event-** I2C failed to write to the splice request data to the decoder.
- **SCTE104 LAN Event-** I2C failed to write to the splice request data to the decoder.
- **SCTE35 Event-** Parsed transport stream and event was fired.
- **SCTE35 GPO Event-** Relay configured by user to have an SCTE35 trigger and an SCTE35 splice_insert message was received.
- **SCTE35 to SCTE104 Event-** Although a number of things can trigger this event, one example is: The decoder received an SCTE104 splice_request_data message but failed to embedded it in the VANC because either an embedder was not available or the ADP packet was too large for the number of available lines.
- **SCTE35 Heartbeat Event-** Have not received an SCTE35 message for a user specified period of time (default 10min).

Appendix C – Specifications

Appendix C.a. Device – base unit

ROHS Compliant	Yes
Includes:	Display, keypad, embedded controller, Chassis/case, Power Supply/line cord
System –	
Display type:	VFD (Vacuum Fluorescent Display)
Display Configuration:	4 lines x 20 characters
Keypad:	Membrane switches
Front Panel Lockout:	Password control, up to 10 alpha-numeric characters (no punctuations or spaces allowed
Configurations Allowed:	Single channel configuration – 8-Slot Dual channels configuration – 4-Slot
Rear panel:	Eight available slots Six I/O interface slots Two video output slots (one per channel)
Remote Operation/Update Interface –	
Type:	Ethernet, 10/100
Rear panel indicators:	Link (Green LED), Activity (Amber LED)
Connector:	RJ45
Serial Remote operation interface –	
Type:	RS232
Protocol:	115, 8, N, 1
Connector:	9-pin D-sub, male
Front Panel Indicators –	
Input LED:	Green indicates valid input on selected input Off indicated no valid signal on the selected input Constant Blinking Green for dual units indicates one valid input and one invalid input
Error LED:	Red indicates error is occurring Off indicated no errors detected
AC Power –	
Operating Voltage:	95–135 VAC or 180–265 VAC
Max Power:	200 W
Current Draw/Power:	
Typical 1 Decoder with 4 option cards:	0.40 A / 50 W
Typical 2 Decoders with 8 option cards:	0.60 A / 70 W
Frequency:	47–63 Hz
Connector:	IEC C14
Line Cord:	Detachable, 6 foot, 3-prong

Device – base unit (Continued)

General –	
Operating Temperature:	0 to 45 degrees C
Heat dissipation	
Typical 1 Decoder with 4 option cards:	171 BTU/Hour
Typical 2 Decoders with 8 option cards:	239 BTU/Hour
Operating Humidity:	<95% Non-Condensing
Cooling:	Forced air, front intake, rear exhaust
Temperature monitor:	Fan failure, internal temperature sensor
Size:	Height – 1RU (1 ¾"), Width = 19", Depth = 19" 19" rack mountable, with removable ears Rack clips and screws included
Weight:	9.5 lbs. (base unit) 12.75 lbs. (fully loaded)
Pollution Degree:	2
Installation Category:	II
Grounding Post:	On chassis
Noise	50 dB SPL at 1 m, C weighted
Standards	FCC Part 15 ICES-003 EN 55022 EN 55024 EN 61000-3-2 EN 61000-3.3 UL 60065 CAN/CSA 60065-03 (Canada) IEC 60065 :2001 (International) EN 60065 :2002 (Europe)

Appendix C.b. MPEG-2/MPEG-4 Decoder (1 Video, 2 Audio) – RD500x Basic feature

ROHS Compliant		Yes
General –		
TS Data Rate:		1-160 Mb/s
Video Decoder –		
Compatibility Standard:		MPEG-2 4:2:0 MP@HL & MP@ML MPEG-4 H.264 Compatible MP@4.1 & HP@4
Video Bit Rate:		MPEG-2 1-80 Mbps (dependent on profile) MPEG-4 H.264 1-50 Mbps (dependent on profile)
Primary Video Formats:		1080i @ 25 Hz, 29.97 Hz, 30 Hz 720p @ 50 Hz, 59.94 Hz, 60 Hz 480p @ 59.94 Hz 480i @ 29.97 Hz 576i @ 25 Hz
Video resolutions:		1080i * 1920/1440/1280/960 720p * 1280/960/640 576i * 720/704/544/480/352
Format Scaling:		Output Format Selectable
Display Modes:		Letterbox, Cropped, & Anamorphic
Aspect Ratio:		16x9, 4x3 (Selectable - format dependent)
Audio Decoder –		
Output Formats:		IEC-60958 (uncompressed) IEC-61937 (compressed) PCM Downmix
Allowed MPEG-2 PES Formats:		MPEG-2 MPEG-1 Dolby Digital (DD or AC-3) Dolby Digital + (DD+ or EAC-3) MPEG-2 AAC ADTS / HE-AAC V1 & V2 MPEG-4 AAC ADTS & LOAS / HE-AAC V1 & V2 All pass-through compatible
PCM Downmix (selectable):		L/R (Stereo), Lt/Rt (Surround), Auto, Mono1, Mono2
Modes (selectable):		User defined, Monitor, Transmission
Reception of a monophonic audio component:		Upon reception of a monophonic audio component, the decoder will duplicate the monophonic audio on both left and right outputs.
AV Lip-sync -		Includes control for audio PTS and PCR tracing
Genlock Capability -		(No Color burst phase adjust on NTSC outputs) HD – Adjustment of pixels and lines. Max number dependent on video mode SD – Adjustment of Color burst phase, pixels, and lines.
Genlock Reference -	Video 1080i @ 25 fps	– Ref 1080i tri-level sync @ 25 fps – Ref PAL “black and burst”
	Video 1080i @ 29.97	– Ref 1080i tri-level sync @ 29.97 fps – Ref NTSC “black and burst”
	Video 1080i @ 30 fps	– Ref NTSC 1080i tri-level sync @ 30 fps
	Video 720p @ 50 fps	– Ref 720p tri-level sync @ 50 fps – Ref 1080i tri-level sync @ 25 fps – Ref PAL “black and burst”
	Video 720p @ 59.94 fps	– Ref 720p tri-level sync @ 59.94 fps – Ref 1080i tri-level sync @ 29.97 fps – Ref NTSC “black and burst”
	Video 720p @ 60 fps	– Ref 720p tri-level sync @ 60 fps – Ref 1080i tri-level sync @ 30 fps
	Video 576i @ 25 fps	– Ref PAL “black and burst”

Video 480i @ 29.97 – Ref NTSC “black and burst”

Note: AC-3 is a registered trademark of Dolby Laboratories

Appendix C.c. CAM Decryption – Basic feature

CAM Decryption –

ROHS Compliant	Yes
General –	
Compatibility Standard:	DVB-CI EN 50221
Number of CAM Slots:	2
Bottom slot assignment:	RDS 1
Top slot assignment:	In single unit, RDS 1 –both CAMs used by RDS 1 In dual unit, RDS 2
Auto CAM insertion/removal detection:	Yes
CAM usage:	Selectable, Enable/Disable
CAM name display:	Yes
Multicrypt Support:	Yes
Decryption Selection –	
Elementary Stream types:	Video (both MPEG2 and MPEG4), Audio
Selection Modes:	Decoded streams Individually elementary streams (Multi-service)
Maximum TS bit-rate:	72 Mbps. The descrambler receives the total input TS bitrate, even if only one service needs descrambling, and the descrambler cannot accept more than 72 Mbit/s. Some inputs can deliver more than 72 Mbit/s."
CAS Supported –	All major CAM modules, including: NagraVision® Irdeto® Viaccess® Conax® NDS® CryptoWorks Mediaguard AstonCrypt

BISS –

Compatibility Standard:	DVB-CSA
Supported Modes:	Mode 1 and Mode E (Injected ID only No Buried ID)
Max TS Bit Rate:	120 Mbps per RDS
Key:	1 BISS Word per RDS
Services:	10 services per RDS

Appendix C.d. 8VSB/QAM Receiver – Option NRD00HCSAA

ROHS Compliant	Yes
RF Input -	
Frequency Range:	50-850 MHz VHF/UHF (Ch2 – Ch69) CATV (Ch2 – Ch134)
CATV Offsets:	FCC, IRC, HRC
Sensitivity:	–15 dBmV
Dynamic Range:	>35 dB
Modulation:	8VSB, QAM-B
Connector:	F-81 Type, panel mount, female
Impedance:	75 ohms
MER:	Accuracy: +/- 1 dB Range: 0 – 35 dB – 38 dB (QAM 256) Low limit flag: User defined
Input Level Flag:	Range: –15 dBmV to +20 dBmV Accuracy: +/-5 dB Low flag limit: User defined
QAM -	
Standard:	ITU-T, Annex B (SCTE DVS-031)
QAM Mode:	64 and 256
De-interleaver:	I=1-128, J=128/1
Nyquist Roll Off (Alpha):	12%, 18%
8VSB -	
Standard:	ATSC A/53E
Decoding Levels:	8
Nyquist Roll Off (Alpha):	11.5%

Appendix C.e. Serial TS Input/Output (DVB-ASI /SMPTE 310M) – Option NRD00H02AA

ROHS Compliant	Yes
General -	
Configuration:	ASI or 310M, selectable (Not simultaneously)
Connector:	(2) BNC, female
Impedance:	75 ohms
ASI Serial TS Input / Output -	
Number of ASI Inputs:	1
Number of ASI Outputs:	1 (non loop-through)
Standard:	EN50083-9 (V2:3/98) DVB ASI
Data Bit Rate:	270 Mbps
Max TS Rate Supported:	160 Mbps (Dependent on configuration)
310M Serial TS Input / Output -	
Number of 310M Inputs:	1
Number of 310M Outputs:	1 (non loop-through)
Standard:	SMPTE 310M
Data Bit Rate:	19.39 Mbps, synchronous

Appendix C.f. Video Output (1 RGBHV/YPbPr, 1 Composite) – Option NRD00H09AA

ROHS Compliant	Yes
Analog Video General -	
Video Standards:	SMPTE 274M (1080i and 1080p), SMPTE 296M (720p) SMPTE 253M (480p) SMPTE 170M (480i) (Reference: EIA 770.2 and 770.3)
Output Formats:	1920 x 1080 Interlaced (1080i) 1920 x 1080 Progressive (1080p) 1280 x 720 Progressive (720p) 720 x 480 Progressive (480p) 720 x 480 Interlaced (480i)
Frame Rates:	1080i@ 25 Hz, 29.97 Hz, 30 Hz 720p@ 50 Hz, 59.94 Hz, 60 Hz 480p@ 59.94 Hz 480i@ 29.97 Hz
Aspect Ratio:	16x9 (fixed: 1080i, 720p) 16x9, 4x3 (selectable: 480p, 480i)
Display Modes:	HD: Letterbox, Cropped SD: Letterbox, Cropped
Composite General –	
Standard:	ANSI/SMPTE 170M-1994 CCIR656 PAL Standard
Output Formats:	
NTSC:	480 Interlaced
PAL:	576 Interlaced

Note: Simultaneous RGB/YPbPr and Composite operation in 480i, 29.97 Hz format only.

Analog Video –	
Number of Outputs:	1 (shared: RGBHV and YPbPr)
Connector:	High Density 15-pin D-sub, female
Impedance:	75 ohms, +/-10%; 1 k ohm for syncs
Return Loss:	>20 dB, 30 KHz – 30 MHz
Frequency Response:	Y = 30 KHz – 30 MHz, +/-0.2 dB ripple PbPr = 30 KHz – 15 MHz, +/-0.2 dB ripple
H/V Sync:	4 Vpp into 1 Mohm, negative polarity
Composite Video Out –	
Number of Outputs:	1 (NTSC/PAL)
Connector:	BNC, female
Impedance:	75 ohms, +/-10%
Return Loss:	>25 dB
Frequency Response:	DC to 6.0 MHz
Amplitude:	140 IRE (1.0 Vpp), +/-2 IRE
NTSC -	
Standard:	ANSI/SMPTE 170M-1994; CCIR656
Format, Frame rate	525 lines, 29.97 Hz (480i)
Setup (pedestal):	On/Off, selectable
Closed Caption:	Enable/Disable, selectable
CC Standard:	EIA-608B
PAL -	
Standard:	ITU-R.BT.470-6 Format, Frame rate: 625 lines, 25.00 Hz
Genlock -	
Line and Pixel Adjustment	
Color Phase Adjustment (NRD00H09AA Only)	

Appendix C.g. Audio Output (DolbyE, AES Digital, Analog) – Option NRD00HA0AA

ROHS Compliant	Yes
General –	
Audio Source:	Selected Audio Services 1-4
# Of Services:	2 supported per NRD00HA0AA option card
Modes:	User defined, Monitor, Transmission
DolbyE PID:	DolbyE extracted digital data output provides extracted DolbyE for embedding
Digital Audio Out –	
DolbyE:	Available with breakout cable on 15-pin D-sub Connector
Digital Output format:	S/PDIF/AES3id (Unbalanced)
Type (selectable):	Raw (native – AC3, MPEG, etc.),
PCM (uncompressed Ch1 and 2),	
Standard:	IEC 60958-3 AC-3 (consumer), MPEG-1/2, layers 1 and 2 AES3id (IEC 60958-4/61937), Ch1/2 (professional)
Connector:	(2) BNC, female
Impedance:	75 ohms
Analog Audio Out -	
Output Type:	Balanced, 2 channel pairs (+/-, L/R)
Source:	Same as selected Digital PCM above
Conditions:	Load=600 ohms, –20 dBFS encoded TS source
Amplitude:	24 dBu Adjustable down to 4 dBu by 2.5 dB steps
Max Output:	24 dBu
THD+N:	<0.01%
Dynamic range	114 dB
Signal to noise ratio	90 dB
Crosstalk:	<-85 dB
Frequency Response:	20 Hz to 20 KHz < +/-0.1 dBu
Connector:	High density 15-pin D-sub, male
Impedance:	600 ohms nominal 50 ohms min.
Options available –	
NRD00HC2AA:	Audio breakout cable with XLR and DolbyE BNC
Connectors:	(4) XLR, male; Chan 1 – L,R Chan 2 – L,R (1) BNC, male; DolbyE (1) High density 15-pin D-sub, female
Length:	14 inches

Appendix C.h. Video Output (2 SD/HD SDI, 1 RGBHV/YPbPr/Composite) – Option NRD00H06AA

ROHS Compliant	Yes
General –	
Connector:	2 Female BNC
Impedance:	75 ohms ±10%
Output Connectors:	2 – SDI, 1 – RGBHV/YPbPr/Composite (Composite/YPbPr output with breakout cable only)
Genlock –	
SDI:	Line and Pixel Adjustment
Composite:	Line, Pixel, Color Phase Adjustment
SDI (Serial Digital Interface) Video Out –	
HD-SDI Standard:	SMPTE 292M SMPTE 274M (1080i and 1080p) SMPTE 296M (720p)
SD-SDI Standard:	ITU-BT.601/SMPTE S259M
Data Bit Rate:	SD-SDI = 270 Mbps HD-SDI = 1.485 Gbps
Display Modes:	HD: Pillarbars, Cropped, Anamorphic SD: Letterbox, Cropped, Anamorphic
Embedded Audio Format:	SD-SDI – SMPTE 272M HD-SDI – SMPTE 299M
Sample Rates Supported:	48 kHz
Sample Rate Out:	48 kHz
Output Squelch:	Selectable – Enable/Disable (when no input is detected, output is muted)
Number of Embedded Audio Channel Pairs:	4 (2 groups, each with 2 pairs)
Audio Types Supported:	AC-3, MPEG-2 layer 1 and 2, or PCM DolbyE (with NRD00HA0AA)
Embedded Audio Control:	Selectable – “type”/disable (each pair independently controlled)
Audio Type Standard:	Compressed (IEC 60958) Uncompressed (IEC 61937)
Closed Captions:	Embedded – EIA-708B or EIA-608B Line 21 – Enabled/Disabled (selectable) SDI and Composite controlled simultaneously
Analog Video -	
Video Format Standards:	SMPTE 274M (1080i and 1080p) SMPTE 296M (720p) SMPTE 253M (480p, 480i) (reference EIA 770.2 and 770.3)
Number of Analog Outputs:	1 (shared: RGBHV or YPbPr/Composite via breakout cable)
Connector:	High Density 15-pin D-sub, female
Impedance:	75 ohms, ±10%, 1 Kohm for syncs
Return Loss:	>20 dB, 30 kHz – 30 MHz
Frequency Response:	Y = 30 kHz – 30 MHz, ± 0.2 dB ripple PbPr = 30 kHz – 15 MHz, ± 0.2 dB ripple
H/V Sync:	4 Vpp into 1 Mohm, positive polarity

Video Output (2 SD/HD SDI, 1 RGBHV/YPbPr/Composite) – Option NRD00H06AA (continued)

Composite Video Out –

Number of Outputs:	1 (NTSC/PAL)
Connector:	Breakout cable into BNC, female
Impedance:	75 ohms, +/-10%
Return Loss:	>25 dB
Frequency Response:	DC to 6.0 MHz
Amplitude:	140 IRE (1.0 Vpp), +/-2 IRE
Chroma/Luma delay	+/- 30 ns max
Field time distortion	< 2%
Line time distortion:	< 1%
Short time distortion:	< 2%
Differential gain:	< 4%
Differential phase:	< 2°
Signal to noise ratio (luminance weighted):	> 55 dB
Display Modes:	Letterbox, cropped, anamorphic

	NTSC	**PAL**
Standard:	ANSI/SMPTE 170M-1994; CCIR656	ITU.R.BT.470-6
Format, Frame rate:	525 lines, 29.97 Hz (Interlaced)	625 lines, 25.00 Hz (Interlaced)
Setup (pedestal):	On/Off, selectable	
Closed Caption:	Enable/Disable, selectable	
CC Standard:	EIA-608B	

VBI -

In HD and SD SDI, binary form:	Teletext S2031M, AFD, CC EIA 608B, CC EIA 708 B, Source ID, SCTE 127
In SD SDI, sampled modulated waveform:	NTSC CC line 21, NTSC AMOL, NTSC TVG2x, PAL Teletext (WST), PAL VPS, PAL WSS
In Composite video:	NTSC CC line 21, NTSC AMOL, NTSC TVG2x, PAL Teletext (WST) (Lines 7 to 22 and 321 to 335), PAL VPS (Line 16), PAL WSS (Line 23)

VBI data is reinserted within +/- 1 frame from associated video
VBI data is reinserted on the original line number

Options available –

NRD00HC3AA:	Analog video breakout cable with BNC
Connectors:	(6) BNC, male; Red/Pr, Green/Y, Blue/Pb, Composite, Horizontal Sync and Vertical Sync (1) High density 15-pin D-sub, female
Length:	60 inches

Appendix C.i. GPIO Module – Option NRD00H10AA

ROHS Compliant	Yes
General –	
Remote Interfaces:	Web GUI and SNMP
+Vcc Voltage Level	+5 @ 800 mA
Relay Type:	High-cycle, High-reliability
Contact Ratings:	>30 VDC @ 500 mA
Event Types:	OON (Out-Of-Network) and RTN (Return-To-Network)
Suggested Connector Type:	Phoenix 2.5 mm Pluggable Terminal Block
I/O –	
Logic Input:	Provides four logic inputs
Logic Outputs:	Provides three open-collector outputs
Voltage Range:	5 – 24 volts logic switching and current limiting
Short circuit protection:	Yes
Relay Contact:	Provides three relay contact outputs

Appendix C.j. Dual Input COFDM Receiver – Option NRD00H04AA

ROHS Compliant	Yes
General –	
Compatibility Standard:	EN 300 744
Spectrum:	Normal or Inverted
Frequency range:	49 MHz – 861 MHz
RF Input Level	-70 dBm to -20 dBm
Channel bandwidth:	6 MHz, 7 MHz, 8 MHz
Guard interval:	1/4, 1/8, 1/16, 1/32
FFT size:	2K, 8K
Code rate:	1/2, 2/3, 3/4, 5/6, 7/8
Constellation:	QPSK, QAM16, QAM64
Connector:	2-F-81 Type, panel mount, female
Impedance:	75 Ohms
Return Loss:	>9 dB

Appendix C.k. Quad Input DVB-S/DVB-S2 Receiver with LNB – Option NRD00H12AB

ROHS Compliant	Yes
General –	
Frequency Range:	950 MHz – 2150 MHz
Number of inputs:	4 (A, B, C and D)
Connector:	F-81 Type, Female (4)
Impedance:	75 Ohms
Return Loss:	>9 dB
Separation:	>50 dB adjacent, >60 dB non-adjacent
RF frequency:	950 MHz to 2150 MHz in 100 KHz steps
Tuning:	Difference between Satellite frequency and LO frequency
Satellite frequency:	950 – 14500 MHz
LO frequency:	0 – 12000 MHz, with presets of 0, 5150, 9750, 10600, 10750 and 11250 MHz
Packet size:	188 bytes
Transport Stream:	Up to 81 Mbps
Nyquist root filter roll-off factors:	.20, .25, .35
RF Input Level:	-65 dBm to -25 dBm
Carrier Loop capture range:	± 5 MHz
Input RF Spectrum:	Normal/Inverted Auto Detect
Image rejection:	>30 db
Noise figure:	15 dB
IF filter bandwidth:	Automatic selection (dependent on symbol rate)
LNB Power and 22 kHz Tone –	
Settings (LNB voltage / tone):	0/off, 13/off, 13/on, 14/off, 14/on, 18/off, 18/on, 19/off, 19/on
LNB Current:	>450 mA DC
LNB over current protection:	Folback current limiting
LNB voltage regulation:	± 4%
22 kHz Tone:	650 mV (± 250 mV) peak-peak
DVB-S –	
Standard:	EN 300 421
FEC Code:	Conv. + Reed-Solomon
Modulation:	QPSK
Modulation/Coding supported:	CCM
Code rates:	1/2, 2/3, 3/4, 5/6, 7/8
QPSK Symbol rate:	1-45 MSym/s
BER:	Observable via front panel and web interface
DVB-S2 –	
Standard:	EN 302 307
Decoding type:	LDPC and BCH
Modulation:	QPSK, 8PSK
Modulation/Coding supported:	CCM
FEC Framing Type	Short frame size (16200), Normal frame size (64800)
QPSK supported rates:	1/4, 1/3, 2/5, 1/2, 3/5, 2/3, 3/4, 4/5, 5/6, 8/9, 9/10
8PSK supported rates:	3/5, 2/3, 3/4, 5/6, 8/9, 9/10
Symbol rate:	1-45 MSym/s
PER:	Observable via front panel and web interface
Pilot:	On/Off Auto Detect

Appendix C.I. Dual Input MPEG over IP Receiver/UDP Output – Option NRD00H05AA

ROHS Compliant	Yes
General –	
Connector:	2 – 10/100/1000 Auto-negotiating Base-T RJ-45 Ethernet Port
FEC Receive:	Licensed – Pro MPEG CoP3 SMPTE 2022 Range: L*D<100 1<L<20 4<D<20 Annex B
Multicast Filtering:	Filters based on IP address (Avoids Problematic 30 IP – 1 MAC)
Receive –	
Input Format:	UDP, RTP, and RTP with extension headers Multicast and Unicast CBR, VBR, Null Stripped
Receiver Capability:	2 simultaneous MPEG over IP transport streams with automatic failover
Buffer size:	1 – 4000 KB, user settable
Bitrate Range:	1 – 160 Mbps
Packets/IP Frame:	1-7 MPEG Packets/IP Frame
IGMP Compatibility:	Version 1, 2, and 3
Transmit –	
Output Format:	UDP
Bitrate Range:	1 – 160 Mbps
Packets/IP Frame:	1-7 MPEG Packets/IP Frame
Number of Outputs:	2 Mirrored TS – Unicast and/or Multicast

Appendix C.m. Dual MPEG over IP output with PID filtering – Option NRD00H13AA

ROHS Compliant	Yes
General –	
Connector:	2 – 10/100/1000 Auto-negotiating Base-T RJ-45 Ethernet Port
Card Latency:	≤1000ms
Transmit –	
Output Format:	UDP
Bitrate Range:	1 – 160 Mbps per TS (constant bit rate) 400 Mbps Aggregate
Packets/IP Frame:	1-7 MPEG Packets/IP Frame
Number of Outputs:	5 Independent TS (MPTS or SPTS), each routed to one of two Ethernet ports as desired – Unicast and/or Multicast
Service/PID Filtering –	
PCR:	PCR restamping
Services:	Max 25 filtered services per transmit group
Table Manipulation:	Automatic table adjustment In MPEG mode: • Adjusted tables: PAT, PMT • Pass through tables: CAT, NIT • Discarded tables: all remaining tables In DVB mode: • Adjusted tables: PAT, PMT, SDT actual • Pass through tables: CAT, NIT, BAT, etc • Discarded table: TSDT

Appendix C.n.SCTE35 to SCTE104 – Software Option NRD00S01AA

Allows the conversion from SCTE35 DPI splice messages extracted from the transport stream to SCTE104 messages embedded as VANC packets on the SDI Outputs.

Appendix C.o.DVB-S2 advanced features – Software Option NRD00S02AA

Software option to enable advanced DVB-S2 modes apply to Quad DVB-S/S2 interface (NRD00H12AB). It enable additional DVB-S2 features. The software option apply at unit level, it means one license whatever it is a single or dual channels model.

General –

Software option to enable advanced DVB-S2 modes apply to Quad DVB-S/S2 interface.

DVB-S2 – additional features

Modulation:	16APSK, 32APSK
Modulation/Coding supported:	VCM
16APSK supported rates:	2/3, 3/4, 4/5, 5/6, 8/9, 9/10
32APSK supported rates:	3/4, 4/5, 5/6, 8/9, 9/10
Symbol rate:	1-45 MSym/s
Pilot:	On/Off Auto Detect
Multistream	Support DVB-S2 multi-stream input. One incoming TS could be selected based on Stream Identifier (ISI)

Appendix D – Pinout for NRD00H09AA, NRD00HA0AA, NRD00H06AA

NRD00H09AA
DB-15 (RGB / YPbPr)

Pin	RGB	YPbPr
1	Red	Pr
2	Green	Y
3	Blue	Pb
4	--	--
5	--	--
6	Ground	Ground
7	Ground	Ground
8	Ground	Ground
9	--	--
10	Ground	Ground
11	--	--
12	--	--
13	Horizontal Sync	--
14	Vertical Sync	--
15	--	--

NRD00HA0AA
DB-15 (Audio)

Pin	Function
1	Chan 1 (Left) +
2	Chan 1 (Right) +
3	Chan 2 (Left) +
4	Chan 2 (Right) +
5	Dolby E data (Digital Output 3)
6	Chan 1 (Left) –
7	Chan 1 (Right) –
8	Chan 2 (Left) –
9	Chan 2 (Right) –
10	--
11	Ground
12	Ground
13	Ground
14	Ground
15	Dolby E ground

NRD00H06AA
DB-15 (RGB / YPbPr / Composite)

Pin	RGB	YPbPr	Comp
1	Red	Pr	--
2	Green	Y	--
3	Blue	Pb	--
4	--	--	--
5	Ground	Ground	Ground
6	Ground	Ground	Ground
7	Ground	Ground	Ground
8	Ground	Ground	Ground
9	--	--	Composite
10	Ground	Ground	Ground
11	--	--	--
12	--	--	--
13	Horizontal Sync	--	--
14	Vertical Sync	--	--
15	--	--	--

Appendix E – Coordinated Universal Time

-12:00 Eniwetok
-11:00 Midway
-10:00 Hawaii
-09:00 Alaska
-08:00 Pacific
-07:00 Mountain
-06:00 Central
-05:00 Eastern
-04:00 Atlantic
-03:30 Newfoundland
-03:00 Greenland
-02:00 Mid-Atlantic
-01:00 Azores
00:00 Greenwich
01:00 Amsterdam
02:00 Athens
03:00 Baghdad
03:30 Tehran
04:00 Abu Dhabi
04:30 Kabul
05:00 Ekaterinburg
05:30 Calcutta
05:45 Kathmandu
06:00 Amaty
06:30 Rangoon
07:00 Bangkok
08:00 Beijing
09:00 Osaka
09:30 Adelaide
10:00 Brisbane
11:00 Magadan
12:00 Auckland
13:00 Nuku

Appendix F – Audio Explanation

Audio Setup

There are three primary modes of audio down mix operation for the RD500x decoders. These settings only affect the signal if the digital output is set to “PCM.” It will also affect those embedded audio channels that are set to a PCM down mix.

The modes are “Monitor” (the default setting), “Transmission”, and “User.”

Note: There are no gain changes if the digital or embedded outputs are set to Raw.

The first mode is “Transmission.” It allows no changes by the customer. It is intended to provide a limited dynamic range signal to drive a set top box or a transmitter. The “Transmission” mode does respond to dialog normalization data. It provides a gain boost of 11 dB and has compression to prevent the signal from overdriving a modulator. The 11 dB gain boost is applied to the analog outputs, AES digital outputs set to PCM, and any embedded outputs set to PCM.

Note: It will not affect the gain of digital outputs or embedded outputs set to Raw.

It is intended to provide a similar audio level as a broadcast TV station signal through an RF modulator. The down mix includes the “center” and “surround” channels if they are present, and is represented as Lt/Rt. (left total/right total)

The second mode is “Monitor.” It has moderate processing, no gain boost and its down mix involves left and right channels only (L/R). The compression setting is “Line” mode as the default, but may be changed to “RF”, “Custom 0” or “Custom 1.” In “Line” mode, the Dolby dialog normalization data is followed. No other parameters may be set by the customer. It is intended for monitoring of sources with only some peak limiting protection. Selecting “RF” as the compression setting will add 11 dB of gain and the same processing as the “Transmission” mode to the analog outputs, AES digital outputs set to PCM, and any embedded outputs set to PCM. The down mix is L/R (left only/right only)

The third mode available is “User.” It allows all parameters to be set by the operator. The compression choices are “RF”, “Line Mode”, “Custom 0”, and “Custom 1.” RF and “Line Mode” essentially duplicate the first two modes of audio mix down described above. The “Custom 0” and “Custom 1” modes have no audio processing or gain boost. “Custom 1” does enable gain changes called for by the dialog normalization data. It allows the operator to enable or disable the dynamic range (peak limiting) and select the channels to downmix “Lt/Rt”, “L/R”, “Auto”, “Mono L”, and “Mono R”. Mono left or Mono right applies that signal to both left and right channels of the digital service, left and right channels of the analog outputs, and left and right channels of any embedded stream set to PCM. “Auto” was introduced with Dolby Digital Plus and will select the downmix of Lt/Rt or L/R based on the received audio metadata. If the metadata is not present or Dolby Digital audio is received, Lt/Rt down mixing is used.

“Custom 0” disregards the Dolby dialog normalization data and runs at a fixed gain. Choosing “RF” as the compression mode will increase the gain by 11 dB for the analog outputs, AES digital outputs set to PCM, and any embedded outputs set to PCM.

If you want to run with no processing, set “*User* / *Custom 1* / *L/R* / *Dynamic Range*” to disabled. This will still allow gain changes called for in the Dolby metadata.

Audio Output Settings

The digital audio services may be set to “PCM” (AES) or “Raw” as an output. This applies to all available sources. The “PCM” setting will pass an AES stream, or automatically down mix an AC-3 Dolby stream to

two channels. “Raw” simply passes thru the Dolby AC-3 data stream to be decoded by an external decoder such as the Dolby 569. The analog channels can be assigned to any of the digital services. The analog gain may be adjusted for the desired level. The gain setting does not affect the level of either the embedded audio or the digital services. A setting of 7 provides an output of approximately 0 dBu for a digital signal level of -20 dBFS. To check the audio output level, set “*User* / *Custom1* / *L/R*” to disabled. This will remove any signal processing in the down mix. Set the digital service to be measured to “PCM.” A test stream of -20 dBFS will output from the digital services as -20 dBFS. If the analog channels are set to a gain setting of 7, the output should be -0.7 dBu plus or minus 0.5 dBu. Each gain number increments or decrements approximately 2.5 dBu per step. When you are setting the output levels it is suggested that an AC-3 stereo tone (2.0) be used as the source. Do not use a Dolby AC-3 5.1 tone source as your test signal. The five channels of equal tones will down mix such that one channel will be more than twenty dB greater than the other.

Digital Audio Measurements

Digital measurements are made in dBFS, decibels related to Full Scale. The normal operating level of a digital audio system is 20 db below the full digital signal. This full digital signal is the point where there are no more bits to describe a higher level. This would be analogous to clipping in the analog world. Since test tones are set to -20 dBFS, there is 20 dB of headroom in the digital system before the system runs out of bits. To test for maximum level, a 0 dBFS test tone is used.

The dynamic range is read directly by reading how many dBFS below 0 dBFS is the noise. If the signal plus noise is -85 dBFS, then the dynamic range is 85 dB. The same method is utilized for THD measurements. Again, the THD reading in dBFS is read directly on the analyzer. If the amount of distortion is wanted in per cent, it can be calculated from the value in dBFS. For example, -84 dBFS would be equivalent to .0063% distortion.

If there are analog outputs that are delivering the same signal as the digital outputs for a digital source, the normal digital level must be compared to a resulting analog level out of the system. In the unit, for a -20 dBFS test tone, the unit analog audio outputs deliver a -0.78 dBu level. If a 0 dBFS test tone is used, the analog outputs deliver a +19.98 dBu level. The analog level is adjustable and the levels above result if the analog gain control is set to “7”. This is the setting THOMSON uses for testing.

The signal to noise in a digital system is measured by stimulating the system with a test tone at -60 dBFS, notching out the tone, and measuring the noise that is left. This measurement is made with the bandpass set by a low pass filter that is slightly below ½ the sampling frequency. In the case of the unit, that is ½ of 48 kHz or 24 kHz. Practically, the filter in the analyzer cuts off about 22 kHz. The tone is necessary because the system mutes if it is not receiving a digital signal.

Analog Audio Measurements

The analog audio measurements utilize the same test signals as the digital test with the exception of the THD measurement. The longer setting time of the analog THD analyzer requires a slower frequency sweep test signal. The analog audio signals in the unit are derived from the decoded digital audio in the unit.

General Audio Setup for Measurements

The unit has three primary operation modes that affect the quantity of compression with decoded Dolby AC3 signals. All tests are made with the “user” mode of operation. This eliminates any signal compression on AC3 Dolby signals downmixed in the unit. This mode has no effect on PCM encoded audio (AES). The analog output gain is set to “7” for all tests. This results in a level of approximately -0.7 dBu for a digital input level of -20 dBFS. This would be the operating level of the unit’s analog outputs for a standard digital signal.